IN THE UNITED STATES COURT OF FEDERAL CLAIMS

Electronically filed on August 28, 2020

IDEKER FARMS, INC., *et al.*, Plaintiffs, v. THE UNITED STATES OF AMERICA, Defendant.	)	No. 14-183 L Senior Judge Nancy B. Firestone

THE UNITED STATES' PHASE II PROPOSED POST-TRIAL FINDINGS OF FACT AND CONCLUSIONS OF LAW

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As directed in this Court's order of August 6, 2020 (ECF No. 656), the United States files its Phase II Findings of Fact and Conclusions of Law ("Post-Trial Brief"). The Evidence presented in Phase I and Phase II make clear that Plaintiffs have not met their burden to establish a taking. The evidence also shows that the Phase II Plaintiffs' claims accrued more than six years before Plaintiffs filed their complaint. And if the court finds that Plaintiffs' complaint was timely and that there has been a taking, the evidence makes clear that Plaintiffs' just compensation figures have been inflated every step of the way.

Unless stated otherwise, references to "Plaintiffs" are to the three Phase II Plaintiffs: Robert Adkins & Sons Partnership ("Adkins" or "Adkins Partnership"), Buffalo Hollow Farms Incorporated ("Schneider" or "Buffalo Hollow"), and Ideker Farms Incorporated ("Ideker" or Ideker Farms"). In each section below, the United States provides several facts and law that apply to all Plaintiffs, followed as appropriate by specific subsections addressing each of the three Plaintiffs individually.

In presenting its evidence and arguments in Phase II, the United States has acknowledged this Court's causation findings in its post-trial opinion, ECF No. 426 ("Trial Opin"), including the Court's conclusion that Plaintiffs' expert Dr. Christensen's modeling of water surface elevations (WSEs) was reliable. The United States also recognizes this Court's subsequent position that those findings constitute "law of the case." *See* ECF No. 535 at 15. The United States does not concede that those findings were correct, but respects this Court's rulings and has structured its Phase II case accordingly. The United States specifically preserves for appeal its

position on those and other issues, including but not limited to causation and relative benefits, which are not addressed separately here.[1]

PROPOSED FINDINGS OF FACT

I. Summary Details about the Representative Properties

A. Robert Adkins & Sons Partnership

1. The Robert Adkins & Sons partnership representative property is located in Sections 14, 15, 21, 22, 23 and 28 of Township 74 North, Range 44 west. Tr. 2661:25- 2662:3 (Zanoni); DX7008-13 (Outline of property on PLSS Map).

2. The farm and tract numbers for the Robert Adkins & Sons Partnership representative property in 2007 were farm number 4077 tracts 2363, 1606, 1604, 3878, 1605, 1001 and farm number 813 tract 850. ECF No. 640 at 3 (Stipulation of Certain Testimony and Exhibits Representing Certain USDA Documents and Phase II Representative Plaintiffs Participation in Certain USDA Programs); DX4678 at 1-22 (Adkins' FSA 578 form for 2007–2002). The farm and tract numbers for the Robert Adkins & Sons Partnership representative property in 2008 were farm number 4077 tracts 1605, 2363, 1606, 1604, 1001, 3878 and farm number 813 tract 850. ECF No. 640 at 3; DX4679 at 140-464 (Adkins' FSA 578 form for 2013–2008). The farm and tract numbers for the Robert Adkins &Sons Partnership representative property in 2010 were farm number 4640 tracts 1001, 1604, 1606, 3878, 2363, 14412 and farm number 813 tract 850. ECF No. 640 at 3; DX4679 at 93-112 (Adkins' FSA 578 form for 2013–2008).

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[1] *See United States v. Sponenbarger*, 308 U.S. 256, 266-67 (1938); *Alford v. United States*, No. 19-1678, 961 F.3d 1380, 1383-87 (Fed. Cir. 2020); *St. Bernard Parish v. United States*, 887 F.3d 1354, 1365 (Fed. Cir. 2018).

B. Ideker Farms Inc.

3. The Ideker Farms Inc. representative property is located in portions of Sections 1 and 13 of Township 62 North, Range 41 west, Sections 6, 7, and 18 of Township 62 North, Range 40 West; and Sections 23 and 26 of Township 3 North, Range 17 East. Tr. 2666:9-16 (Zanoni); DX7008-24 (Outline of property on PLSS Map).

4. The farm and tract number for the Ideker Farms Inc. representative property in 2007 was number 3167, tract 249. ECF No. 640 at 2; DX4927 at 1-11 (Ideker's FSA 578 form for 2007). The farm and tract number for the Ideker Farms Inc. representative property in 2008, 2010, 2013, and 2014 was farm number 3729, tract 249. ECF No. 640 at 2; DX4928 at 1-15(Ideker's FSA 578 form for 2008); DX4930 at 1-12(Ideker's FSA 578 form for 2010); DX4933 at 1-10(Ideker's FSA 578 form for 2013); DX4934 at 1-7 (Ideker's FSA 578 form for 2014).

C. Buffalo Hollow Farms Inc.

5. The Buffalo Hollow Farms Inc. representative property is located in portions of Sections 9, 10, 11, 3, and 2. Tr. 2668:24-2669:2 (Zanoni); DX7008-33 (Outline of property on PLSS Map).

6. The farm and tract number for Buffalo Hollow Farms Inc. in 2007 was farm number 2695, tract 2532. ECF No. 640 at 3; DX5412 at 1-8 (Buffalo Hollow's FSA 578 form for 2007). The farm and tract number for Buffalo Hollow Farms Inc. in 2008 was farm number 2695 tract 2852. ECF No. 640 at 3; DX5411 at 1-15 (Buffalo Hollow's FSA 578 form for 2008). The farm and tract number for Buffalo Hollow Farms Inc. in 2010, 2013, and 2014 was farm number 2695, tract 2909. ECF No. 640 at 3; DX5409 at 1-6 (Buffalo Hollow's FSA 578 form for 2010); DX5430 at 109(Buffalo Hollow's FSA 578 form for 2013); and DX5405 at 1-13 (Buffalo Hollow's FSA 578 form for 2014). There is a portion of land with the same farm and tract number that extends beyond the representative property boundaries. ECF No. 640 at 3.

7. In addition, the United States put into evidence detailed surveys of Plaintiffs' properties, showing general land measurements, topography elevations, and pertinent drainage structure elevation information for each of the three properties. ECF No. 634 (stipulation with detailed maps and drain structure elevations). *See also* DX4872; DX4875; DX5456; DX4871; DX4874; DX5455 (maps and drain structure elevations for each property).

II. Summary Details about Certain Witnesses

8. Dr. Ari Kelman is the United States' expert historian witness. Dr. Kelman has deep professional knowledge of river systems and the experiences of people who live near them. *See* Tr. 1247:9-1250:10 (Kelman); DX4865-0094 to -0105 (Kelman CV). Dr. Kelman analyzed thousands of documents from a wide variety of sources to understand the history of the Missouri River and motivations of the people who live near it. Tr. 1250:24-1251:17 (Kelman).

9. Dr. David Sunding is the United States' expert witness in agricultural economics and econometics. Dr. Sunding is a professor of agricultural and resource economics at the University of California at Berkeley. He has been on the faculty there since 1992, specializing in agricultural economics, applied econometrics, natural resource economics, and law and economics. Tr. 2736:12-19 (Sunding). He also has been a visiting professor at Stanford in the Woods Institute of the Environment. He has won a number of research awards over the course of his career. In 2009, he was named the inaugural Thomas J. Graff Professor in the College of Natural Resources at Berkeley in the area of natural resource economics, with an emphasis in the economics of water resource. He has served two terms as chair of Berkeley's Department of Agricultural and Resource Economics, the number one department in the field according to the National Research Council. In 1996 and 1997, he served as the senior economist at the White House at the President's Council of Economic Advisors where he had responsibility for the areas of agriculture, energy, the environment and natural resources. He has served on panels of the

United States EPA's Science Advisory Board and the National Academy of Sciences. He has testified before Congress on a number of occasions, including testimony on the Clean Water Act and the Endangered Species Act, and the economic effects of those laws. Tr. 2737:7-2739:10 (Sunding); DX 6033-0031-068 (Sunding CV).

10. Dr. Robert Evans is the United States' expert witness in agricultural engineering. He has over thirty-five years of experience conducting agricultural water table management research and advising farmers about strategies to manage on-farm water to optimize agricultural production. Tr. 2337:9-14 (Evans). Dr. Evans has over 50 years of first-hand experience managing excess water on his family farm, a farm comprised of inherently wet, poorly drained soils. Tr. 2337: 21-23 (Evans) and Tr.2343: 25-2443:3 (Evans). He has Ph.D., M.S., and B.S., in Biological and Agricultural Engineering from North Carolina State University. Tr. 2338: 20-23 (Evans). Dr. Evans has served as a Professor Emeritus at North Carolina State University since 2017 and head of the Department of Biological and Agricultural Engineering from 2006 until 2014. Tr. 2339:7-12 (Evans). He has taught or co-taught courses on DRAINMOD to engineers and other professionals across the United States, including the mid-west. Tr. 2342:15-19 (Evans). Over the course of his career, Dr. Evans' research has usually been conducted at the field scale, frequently on private farms where he worked directly with farmers. Tr. 2343:11-23 (Evans). His research studies typically included on-farm demonstrations and education programs where he taught farmers how to more efficiently manage on-farm water. Tr. 2344:1-9 (Evans). Dr. Evans has authored or co-authorized around 200 publications in his field, including publications on the "development of crop susceptibility factors, stress day index models and predicting crop yield response to water related stresses and plant delays." Tr. 2340:10-14 (Evans). Additionally, he has authored two book chapters related to "the effects of excess water on crop growth and yield." Tr.

2340:15-17 (Evans). Dr. Evans is highly decorated in the field of agricultural engineering. He was inducted into the International Drainage Hall of Fame in 2013 and has received awards in the area of irrigation and drainage and soil water engineering from the American Society of Civil Engineers and the American Society of Agricultural and Biological Engineers. Tr. 2341:4-11 (Evans); DX4611 (Evans CV).

11. Dr. Robert Holmes is an expert witness for the United States in the field of hydraulics and hydrodynamics. *See generally* DX4694 (Holmes CV). Dr. Holmes has spent his entire thirty-three year career with the United States Geological Survey ("USGS"), concentrating his efforts on the study of river hydrodynamics. Tr. 1583:3–7 (Holmes). Dr. Holmes currently serves as the Chief of the Branch of Hydrodynamics for the USGS. Tr. 1584:4–6 (Holmes). As Chief, Dr. Holmes oversees USGS research and scientific investigations in the areas of open-channel hydraulics, erosion, sedimentation, and fluvial geomorphology; and supervises and mentors scientists and their projects involved in hydrodynamics studies, including those involving hydraulic and sediment transport modeling. Tr. 1584:7–15 (Holmes). He previously served as the agency's National Flood Hazard Coordinator. Tr. 1484:16–17 (Holmes). In that role, Dr. Holmes was the lead flood scientist for USGS operational scientific endeavors nationwide, spending time on-site for data collection during and in the aftermath of major floods across the country, and leading the planning and execution of flood studies after such floods. Tr. 1584:19–24 (Holmes). Dr. Holmes has extensive experience with the Missouri River, dating back to his time as an undergraduate, and including overseeing and conducting sediment transport measurements and related studies, as well as investigations in sedimentation and levee breach hydrodynamics following the flooding in 1993. Tr. 1589:19–1591:12 (Holmes). Dr. Holmes earned a B.S. and M.S. from the University of Missouri-Rolla (Missouri-Rolla (now the Missouri University of

Science and Technology, where he is now on the faculty) and a Ph.D from the University of Illinois. Tr. 1586:14–22, 1587:25–1588:6, 1588:1589:4 (Holmes). Dr. Holmes lives in Rolla, Missouri, about fifty miles from the Missouri River. Tr. 1591:13–24 (Holmes).

12. Jonathan Jones is an expert witness for the United States in the areas of hydrology, hydraulics, and flood risk assessment. *See generally* DX4840-A (Jones CV). Mr. Jones is the CEO of Wright Water Engineers in Denver, Colorado, where he has worked as a water resources engineer for the last thirty-nine years. *Id.* Mr. Jones holds B.S. and M.E. degrees in civil engineering from the University of Virginia, and is a registered professional engineer in nineteen states. *Id.* He is also a registered professional hydrologist with the American Institute of Hydrology and a diplomate of water resources engineering with the American Academy of Water Resources Engineers. *Id.* Mr. Jones's consulting experience includes work in the areas of river hydrology and hydraulics, including characteristics of dynamic, sand-bed channels; hydraulic modeling and river data interpretation; and site-specific analyses of flood history, flood flows, channel capacity, and other factors connected to flood risk expectations. *See id.* Mr. Jones also has instructed courses, seminars, and conference workshops for the American Society of Civil Engineers (ASCE), the University of Colorado, the University of Wisconsin Continuing Engineering Education Program, and others. *See id.* He has contributed to numerous professional activities, including leadership roles on manuals of engineering practice, advisory and review committees, and professional conferences. Mr. Jones has authored, co-authored, and/or served as the committee chair for over 100 professional books and papers, and has conducted professional practice investigations for the Colorado and Wyoming State Board of Registration for Professional Engineers. *See id.*

13. Dr. Andrew Earles is an expert witness for the United States in the areas of hydrology, hydraulics, and flood risk assessment. *See generally* DX4527-0093 to -0113 (Earles CV). Dr. Earles is the vice-president of water resources for Wright Water Engineers in Denver, Colorado. Tr. 2172:21–24 (Earles). Dr. Earles holds a Bachelor's degree in civil engineering from Stanford University and Master's and Ph.D degrees in civil and environmental engineering from the University of Virginia. In his twenty-one-year career as a water resources engineer, Dr. Earles has conducted many real-world flow frequency studies and flood risk assessments, including post-flood evaluations and the development of flood hazard mapping. Tr. 2172:25–2173:3, 2173:14–2174:5, 2175:4–7 (Earles). Dr. Earles has substantial experience applying the flow frequency methodologies described in Bulletins 17B and 17C of the Advisory Committee on Water Information, which provide industry-standard guidelines for determining flood flow frequencies. Tr. 2173:13–24, 2175:7–11 (Earles). At the request of one of the developers of Bulletin 17C, Dr. Earles provided beta testing of a pre-release version of the PEAKFQ program implanting new algorithms. Tr. 2175:12–17 (Earles). His professional experience also includes projects on the mainstem of the Missouri River. Tr. 2174:7–2175:3 (Earles). Dr. Earles's opinions rebut the opinions presented by Plaintiffs' expert Dr. Larry Mays. Tr. 2176:2–4 (Earles).

III. Summary of Mainstem System Operations and Regulation, 2015–2018[2]

14. In 2015, the base of the annual flood control zone was reached in January. Ph. I Tr. 7213:2–12 (Farhat). Runoff was average above Sioux City and well above average below and

[2] The United States includes this information as context about the Corps' actions and basin conditions in the years Plaintiffs allege continued flooding as a result of the on-going implementation of the Missouri River Recovery Program (MRRP). *See* Tr. 159:6-19 (Schneider); Tr. 60:12-16 (Adkins); Tr. 244:10-25 (Ideker).

high tributary inflows occurred in the lower basin from late spring through fall. *Id.* 7213:2-21 (Farhat). A rare December flood also occurred in the lower basin. *Id.* 7215:21–7216:1 (Farhat).A steady release was set for the Threatened & Endangered ("T&E") purposes in early May, and then cycled down during periods of high tributary flows downstream in May and June. *Id.* 7214:5–12 (Farhat). There were numerous periods of rainfall in the lower basin from mid-July through early October. *Id.* 7215:13–21 (Farhat). There was no spring pulse. *Id.* 7213:16–18 (Farhat).

15. The Corps evacuated the prior year's flood water and was prepared for 2016 flood operations by ensuring system storage was at the base of the annual flood control zone in January 2016. *Id.* 7216:19–7217:4 (Farhat). The Corps reduced Gavins Point releases in May and June during periods of high tributary inflows to reduce flood risk downstream. *Id.* 7217:22–7218:2 (Farhat). Runoff in 2016 was below average above Sioux City and above average below. *Id.* 7216:11–15 (Farhat). There was no spring pulse. *Id.* 7216:21 (Farhat).

16. The Corps evacuated the prior year's flood water and was prepared for 2017 flood operations by ensuring system storage was at the base of the annual flood control zone in January 2017. Tr. 1350:17–21 (Remus). After the navigation season began, the Corps twice cut Gavins Point releases by 10,000 cfs during periods of high tributary inflows downstream to reduce flood risk. *Id.* 1351:22–1352:23 (Remus). Between May 10 and May 17, releases were cycled up by 3,000 cfs on two days for T&E purposes. *Id.* 1352:6–19 (Remus). Steady releases from Gavins Point were made from the end of May through early October, when the Corps again reduced releases for about two weeks in response to high tributary inflows downstream,, to reduce flood risk. *Id.* 1353:1–18 (Remus). Between late May and early October, inflows from downstream tributaries caused gages downstream to hit a number of smaller peaks. *Id.* 1353:6–10 (Remus).

Runoff in 2017 was above average above Sioux City and average below Sioux City. *Id.* 1350:6–16 (Remus). There was no spring pulse. *Id.* 1350:22–23 (Remus).

17. The Corps evacuated the prior year's flood water and was prepared for 2018 flood operations by ensuring system storage was at the base of the annual flood control zone in January. *Id.* 1354:15–19 (Remus). Precipitation was very high in the upper basin and the upper portion of the lower basin. *Id.* 1355:12–19 (Remus). After the navigation season began, the Corps cut Gavins Point releases by 20,000 cfs for a week in June during a period of high tributary flows downstream to reduce flood risk. *Id.* 1356:16–20 (Remus). Due to hydrologic conditions, there were no operations for T&E species. *Id.* 1355:20–25 (Remus). By the end of July, releases had increased to 58,000 cfs to evacuate upstream runoff, and were held close to that level through November. *Id.* 1356:21–25 (Remus). Large runoff events in the lower basin continued into December, and there was widespread flooding from interior drainage. *Id.* 1357:17–1358:1 (Remus). High releases were maintained despite these drainage issues to ensure that the flood control zone was evacuated in advance of the 2019 runoff season,, to reduce flood risk in 2019. *Id.* 1358:10–15 (Remus). Runoff in 2018 was much above average, the third-highest runoff above Sioux City at that time. *Id.* 1354:2–5 (Remus). Runoff below Sioux City was below average on the whole, but was much above average in the reach from Sioux City to Nebraska City. *Id.* 1354:6–10 (Remus). There was no spring pulse. *Id.* 1355:6–7 (Remus).

IV. Summary of Changes to the MRRP under the 2018 Missouri River Recovery Management Plan Record of Decision

18. In November 2018, at the end of a more than five-year process, the Corps issued a record of decision ("ROD") updating the suite of actions necessary for Endangered Species Act ("ESA") compliance in connection with the operation of the Missouri River Mainstem Reservoir System ("System") and the Bank Stabilization and Navigation Project ("BSNP:), known as the

Missouri River Recovery Management Plan ("MRRMP") and Environmental Impact Statement ("EIS").. Tr. 1342:14–22 (Remus) (discussing DX5075, MRRMP ROD). As a result, the Corps also updated the Missouri River Master Water Control Manual ("Master Manual"). *Id.* 1346:8–15 (Remus).

19. The MRRMP process also updated the consultation under Section 7 of the Endangered Species Act ("ESA") with the U.S. Fish & Wildlife Service, resulting in a "no jeopardy" biological opinion ("BiOp") in 2018. *Id.* 1345:6–13 (Remus). Compliance with the actions in the MRRMP are an integral part of the System and BSNP operations. *Id.* 1345:10-13 (Remus). "[R]egulation of the System in accordance with the Master Manual to serve authorized project purposes is dependent upon successful implementation of the 2018 Biological Opinion . . . Simply put, the Corps must comply with environmental laws including the ESA, and the MRRP is the vehicle used to accomplish this." *Id.* 1345:15–19 (Remus) (quoting DX5065, 2018-2019 Annual Operating Plan). Similar language is also in the 2010-2011 Annual Operating Plan. *Id.* 1346:4-6 (Remus) (DX 476).

20. Under the MRRMP, the spring pulse and reservoir unbalancing criteria (adopted in 2004/2006) were removed from the 2018 Master Manual. *Id.* 1343:9–15 (Remus). The remainder of the system operations described in the 2006 Master Manual were unchanged. *Id.* 1343:14–19 (Remus).

21. Under the MRRMP, the Corps is no longer constructing shallow-water habitat projects to meet goals laid out in the 2003 BiOp. Instead, the Corps plans to modify twelve river bends to create interception and rearing complexes ("IRCs") for the pallid sturgeon. IRC implementation is occurring downstream of Kansas City. Two projects which included minor modifications of BSNP structures have been constructed to date. Tr. 1469:20–1471:9 (Pridal).

22. The Corps also plans to construct pallid sturgeon spawning habitat at up to three sites. While the Corps anticipates that spawning sites will be constructed in the upstream reaches with possible minor BSNP structure modification, no spawning sites have been constructed to date. *Id.* 1471:10–22 (Pridal).

V. Phase II Concerns Only the Effect of the Increment of Flooding Attributable to the Corps' Actions Under the MRRP, on Which Plaintiffs Bear the Burden of Proof

23. While the Court determined in Phase I that the United States' actions had caused some flooding in certain years, the Court definitively did not find that the United States' actions had caused all of the flooding. Extensive evidence shows that some flooding and damage to crops due to wet stress would have occurred regardless of the United States' activities.

A. The Court Already Held That Corps' Actions Exacerbated, But Did Not Cause All the Flooding on Plaintiffs' Properties

24. In Phase I, the Court found that the "the flooding at issue in this litigation has occurred in the context of high River flows that were naturally occurring during periods of high precipitation or high tributary inflows." Phase I Trial Op. ("Trial Op.") at 29, ECF No. 426.

25. The Court then held that "Corps' River Changes have, together with the Corps' System Changes, caused WSEs [Water Surface Elevations] to rise higher than they would have risen without these Changes and that this rise in WSEs has led to more flooding or more severe or longer flooding than would have occurred had these Changes not been made by the Corps." Trial Op. at 93. The Court attributed the increased WSEs to the combined and cumulative effects of the Corps' System and River Changes and for the most part did not "examine[] any individual Corps project." Trial Op. at 150 n.73.

26. By extension, the Court did *not* determine that there would have been *no* flooding but-for the Corps' actions. Plaintiffs' causation experts also conceded or implied that some flooding would have occurred, regardless of the United States' activities. *See, e.g.,* Ph. I Tr.4581:22-

4582:18 (Christensen) (acknowledging that some flooding would still have occurred at points downstream of Gavins Point during 2010); Ph. I Tr. 5236:1-6 (Hromadka) (admitting that weather-related events contributed the flooding); Ph. I Tr. 5238:8-11; (Hromadka) (opining only that "[b]ut for the system changes, the property would not have flooded, *or the flooding in question would have been less severe and/or a shorter duration*" (emphasis added); Ph. I Tr. 5284:11-17, 5428:8-10, 5457:2-4 (Hromadka) (same observation for flooding at the three Phase II plaintiff properties).

27. The Court's Phase I conclusions about causation relied on charts prepared by Dr. Hromadka showing the difference between the actual and "but-for" WSEs, as modeled by Dr. Christensen. *See* Trial Op. 99 & n.50 (discussing PX2025-A). The Court accepted these charts as substantive evidence of the actual and but-for WSEs. *See id.*

28. Plaintiffs admit that local rainfall contributed to some flooding on their properties. Ph I Tr. 1482:24-1483:4; 1463:8-25 (Adkins); Ph I Tr. 2334: 15-2335: 25; 2355:11-24 (Schneider).

29. Ron Schneider admits that at Buffalo Hollow, cloudiness and lack of sun contributed to the wetness of the property and difficulty drying the property out after rainfall in some years. Tr. 2355: 11-2356: 6 (Schneider).

30. Ideker Farms and the Adkins Partnership admit that the weather conditions always cause variability in yields and this variability will continue in the future. 01/29/2020 Dep. Tr. 74:23-75:4 (Ideker Farms); *see also* 01/28/2020 Dep. Tr. 46:6-12 (Adkins Partnership). The Adkins Partnership believes that floods, hailstorms, and droughts are all factors to worry about. 01/28/2020 Dep. Tr. 140:13-24 (Adkins Partnership).

B. Dr. Evans Modeling Shows that Plaintiffs' Properties Would Have Experienced Some Flooding Regardless of the United States' Actions

31. Dr. Evans compared the actual yields on Plaintiffs' properties to the yields that would have occurred in the but-for river management condition and found that crop yields would have been similarly affected in both scenarios.[3] To achieve optimum productivity, crops require aerated roots, meaning that yield damage due to wet stress can occur even if there is no water present at the soil surface. Tr. 2355:1-4 (Evans). In fact, "a little bit of water for a long duration can do as much damage as a lot of water." Tr. 2443:2-4 (Evans). Indeed, "[o]nce the root zone becomes saturated, it is no longer an issue of how much or how deep the water is, but rather and issue of how long it is saturated." Tr. 2443:5-8 (Evans). Further, "water ponded more than 3 feet deep really doesn't make any difference to the crop" because "any depth greater than three feet deep for more than three or four days results in crop death regardless of depth." Tr. 2436:12-2437:3 (Evans); DX4647-82 (Ideker but-for and actual water table plots); DX4647-83 (water table and elevation tables); DX4647-84 (water table and elevation tables). For example, a comparison of Dr. Evans simulated but-for yields and simulated actual yields show that in years such as 2010, where yields were very low in the actual river management condition, yields would also have been very low in the but-for river management condition. Tr. 2347:6-12 (Evans). Corn yield impacts on the Ideker property were small landward of the levee. Tr. 2349:9-12 (Evans); DX7007-23; DX4612-20. The Ideker representative property would have been extremely wet in the but-for condition as well as the actual such that in either case, yields were very low. Tr. 234917-20 (Evans).

[3] Dr. Evans' methodology is discussed in detail in Section IX.E below.

32. The Ideker representative property would have had serious ponding in 2007 in the but-for as well as the actual condition. Tr. 2435:11-2437:10 (Evans); DX4647-77 (2007 but-for and actual ponding). Additionally, in 2007, the majority of the Ideker representative property would have experienced ponding ranging from one week to four weeks and eight weeks riverward of the levee in the but-for condition, resulting in severe yield depression. Tr. 2437:24-2438:8 and Tr. 2439:15-2440:7 (Evans). The duration of flooding that occurred in the actual condition also ranged from about one week to eight weeks. Tr. 2437:12-23 (Evans); DX4647-79 (2007 Ideker duration maps). A comparison of 2007 simulated corn yields in the actual and but-for condition shows that yield would be depressed in both conditions due to prolonged saturation achieving less than 10% of potential yield in the actual condition, and 15.5% of potential yield in the but-for condition. Tr. 2446:3-2447:10 (Evans); DX4647-78 (Ideker 2007 corn yield maps - mis-read in the transcript as DX4647-178). Predicted soybean yield in 2007 on the Ideker property was very similar in the actual and but-for conditions. Tr. 2447:12-2448:11 (Evans); DX4606-31 (Ideker 2007 actual and but-for soybean yield maps).

33. In 2008, ponding occurred over three-quarters of the Ideker Farms representative property in both the actual and but-for river conditions, with the aerial extent of ponding only a little less in the but-for river condition. Tr. 2449:2-13 (Evans); DX4606-6 (2008 Ideker ponding maps). The duration of ponding on the Ideker representative property in 2008 "would still have lasted long enough to cause major yield reductions." Tr. 2449:14-2450:2 (Evans); DX4647-87 (Ideker 2008 duration maps). The predicted corn yield on the Ideker representative property in 2008 in the actual condition was better, but not a lot better, than the but-for conditions. Tr. 2450:4-12 (Evans); DX4606-25 (2008 Ideker corn yield maps).

34. In 2010, there would have been ponding over most of the property in the but-for condition at a depth approaching two feet along the levee. Tr. 2451:6-18 (Evans); DX:4621-2 (2010 Ideker ponding maps). The ponding depth in the but-for condition would have saturated crop roots causing severe yield reduction in the but-for condition. *Id.* In 2010 duration of ponding on the Ideker property in both the actual and but-for conditions "lasted for weeks across much of the property, long enough to cause severe yield damage in either case." Tr. 2452;3-10 (Evans); DX4621-3 (Ideker 2010 duration maps). In 2010, the Ideker representative property would have experienced "widespread yield suppression" for corn and soybeans in both the actual and but-for conditions. Tr. 2452:11-2453:2 (Evans); DX4606-26 (2010 Ideker corn yield maps); DX4606-33 (2010 Ideker soybean yield maps).

35. In 2013, ponding on the Ideker property in both the actual and but-for conditions was limited to the 55-acre fields outside of the levee where ponding in excess of three feet occurred in both cases. Tr. 2453:4-14 (Evans); DX4606-9 (2013 Ideker ponding maps). The duration of ponding on outside the levee on the Ideker representative property in 2013 would have been "long enough in both cases to result in significant yield depression. Tr. 2453:16-2454:1 (Evans); DX4621-12 (Ideker 2013 duration maps). Corn yields on the Ideker representative property were good inside the levee in the actual condition, with only a small area of reduced yield along the levee that is not reduced in the but-for condition. Tr. 2454:3-16 (Evans); DX4606-28 (2013 Ideker corn yield maps). Corn yields riverward of the levee are reduced in both the actual and but-for conditions. *Id.* 2013 soybean yields on the Ideker representative property appear to be "similar in both the actual and but-for river conditions." Tr. 2454:18-25 (Evans); DX4606-35 (2013 Ideker soybean yield maps).

36. In 2014 there would have been ponding on the Ideker representative property in the but-for condition. Tr. 2455:2-10 (Evans); DX4606-10 (2014 Ideker ponding maps). In 2014, the duration of ponding on the Ideker representative property was generally longer in the actual than the but-for condition, but there were locations on the property where the duration of ponding was longer in the but-for condition. Tr. 2455:11-22 (Evans); DX4647-95 (Ideker 2014 duration maps). 2014 corn and soybean yields on the Ideker representative property riverward of the levee yields were near zero in both the actual and but-for conditions. Tr. 2455:24-2456:10 (Evans); DX4606-29 (2014 Ideker corn yield maps); DX4606-36 (2014 Ideker soybean yield maps).

37. In 2007, water was on the Buffalo Hollow representative property landward of the levee for less than one week in 2007 meaning that a large impact to yield would not be expected. Tr. 2462:12-16 (Evans). Ponding depth is not much different in the actual and but-for conditions on the Buffalo Hollow Farms Property in 2007. Tr. 2462:1-11 and 2463:16-17 (Evans); DX4607-2 (2007 Buffalo Hollow ponding maps). Duration of ponding in 2007 on the Buffalo Hollow representative property was similar in both the actual and but-for conditions. Tr. 2462:12-16 and 2463:19-23 (Evans); DX4647-144 (Buffalo Hollow duration maps). There is not much difference in expected corn or soybean yield in the actual and but-for conditions at the Buffalo Hollow representative property in 2007. Tr. 2462:23-2463:1 and 2454:1-5 (Evans); DX4607-16 (Buffalo Hollow actual corn yield maps); DX4607-22 (Buffalo Hollow a soybean yield maps).

38. In 2008, there is ponding on the Buffalo Hollow property in both the actual and but-for scenarios. Tr. 2464:21-2465:4 (Evans); DX4607-3 (Buffalo Hollow ponding maps). Large portions of the representative property were inundated for 1-7 days in the but-for condition. Tr. 2465:6-14 (Evans); DX4647-153 (Buffalo Hollow duration maps). Simulated corn yields on the Buffalo Hollow representative property were severely impacted in both by ponding and wetness

in both the actual and but-for river conditions. Tr. 2465:24-2466:6 (Evans); DX 4607-17 (Buffalo Hollow 2008 corn yield maps). The southeastern 25% of the Buffalo Hollow property would have suffered severe impacts in 2008, regardless of any Corps changes. *Id.* Soybean yield was depressed on the Buffalo Hollow representative property in both the actual and but-for condition. Tr. 2466:8-18 (Evans); DX4607-23 (Buffalo Hollow 2008 soybean yield maps).

39. Ponding on the Buffalo Hollow representative property would have also occurred in the but-for condition outside the levee in 2010. Tr. 2466:20-2467:10 (Evans). DX4607-4 (Buffalo Hollow ponding maps). There would also have been a small amount of interior ponding in the lowest area of the property in the but-for condition in 2010. *Id.* There would have been significant areas with depressed corn yields with about 20% of the property experiencing no corn yield in the but-for condition. Tr. 2468:3-8 (Evans); DX4607-18 (2010 Buffalo Hollow corn yield maps). Soybean yields were also depressed in the but-for condition in lower areas of the representative property that are routinely wet. Tr. 2486:10-16 (Evans); DX4607-24 (2010 Buffalo Hollow soybean yield maps).

40. The only flooding that occurred on the Buffalo Hollow representative property in 2013 occurred outside the levee. Tr. 24698:18-2469:3; DX 4607-6 (Buffalo Hollow Ponding actual and but-for ponding maps). There would have been very little ponding outside the levee in the but-for condition, but even in the actual condition, "2013 was not a very serious flood year." *Id.* Simulated corn yield damages "were limited to the area outside the levee and there would have been only minor yield reductions outside the levee in the but-for condition." Tr. 2469:11-21 (Evans); DX4607-20 (Buffalo Hollow 2013 corn yield maps). "Soybean yields are the same in the actual and but-for condition" on the vast majority of the representative property. Tr. 2469:22-2470:7 (Evans); DX4607-26 (Buffalo Hollow 2013 soybean yield maps).

41. There was not much ponding on the Buffalo Hollow representative property in 2014 in either the actual or but-for conditions. Tr. 2470:14-19 (Evans); DX4607-7 (Buffalo Hollow ponding maps). Additionally, the duration of the ponding was not very severe in either river management condition. Tr. 2470:20-2471:3 (Evans); DX4647-164 (Buffalo Hollow actual and but-for duration maps). Simulated corn and soybean yields interior to the levee were not depressed in either the actual or but-for river management conditions. Tr. 2471:6-21 (Evans); DX4607-21 (Buffalo Hollow 2014 corn yield maps); DX4607-27 (Buffalo Hollow 2014 soybean yield maps). There was a slight MRRP yield impact outside the levee. *Id.*

42. In 2007, there was significant ponding landward the levee in both the actual and but-for conditions. Tr. 2476:7-12 (Evans); DX4605-2 (Adkins depth mapping). There was also ponding riverward of the levee in the but-for condition. *Id.* The duration of ponding landward of the levee was less than 7 days in both the actual and but-for conditions, which is unlikely to result in significant yield impacts. Tr. 2476:19-2477:2 (Evans); DX4647-115 (Adkins duration mapping). In the actual condition, WSEs would have been high enough to block drainage, but they were not high enough to cause much seepage. Tr. 2477:11-17 (Evans); DX4647-116 (Adkins watertable plots). Additionally, Water surface elevations did not reach the surface on the highest elevations of the Adkins representative parcel and no ponding occurred, meaning yield depression for these portions of the property was not due to flooding. Tr. 2477:4-2480:7 (Evans); DX4647-115 (Adkins watertable plots); DX4647 (Adkins watertable plots); DX4647-117 (Adkins watertable plots); DX7007-43 (Dry stress graph). "[T]he primary factor reducing corn yield in 2007 at the Adkins property was drought, it was not the elevated river level." Tr. 2480:21-24 (Evans); DX4605-16 (Adkins corn yield mapping). Simulated soybean yield is comparable in the actual and but-for conditions with the best yields in both scenarios occurring in the low lying areas near

the levee, while poorer yields were located at higher elevations without irrigation. Tr. 2481:7-19 (Evans); DX4605-22 (Adkins soybean yield mapping).

43. Some ponding would have been present on the Adkins property in 2008 even in the but-for condition. Tr. 2482:7-12 (Evans); DX4647-120 (Adkins duration mapping).

44. In 2010, severe ponding would have occurred outside the levee in both the actual and the but-for conditions. Tr. 2483:7-20 (Evans); DX4606 (Adkins depth mapping). Duration of most of the flooding in the but-for condition would have been less than 2 weeks, with fields adjacent to the levee ponded for more than two weeks. Tr. 2484:4-8 (Evans); DX4647:129 (Adkins duration mapping). Corn yield in 2010 would have been "severely impacted" in southern half of the property in the but-for condition. Tr. 2484:9-17 (Evans); DX4605-18 (Adkins corn yield mapping). Soybean yield impacts in 2010 would have be severe over the southern 25% of the property in the but-for condition. Tr. 2484:19-24 (Evans); DX4605-24 (Adkins soybean yield mapping).

VI. Character of the Land: Plaintiffs' Land Has Always Been Subject to Flooding

45. Evaluating the character of the land in a takings analysis requires the Court to examine the history, location, and other characteristics related to the Plaintiffs' properties. *See* Section XII.[4]

[4] Many of the underlying facts in the record relate to both character of the land and reasonable investment-backed expectations. While the United States has cited each fact only once to avoid duplication, the United States respectfully submits that all underlying facts be considered for each topic.

A. The Land in this Case Has Been Subject to Flooding Historically, Before and After the Corps Constructed the System and BSNP

1. Examples of Flooding Before Reservoirs Were Constructed and Fully Operational

46. The Missouri River has historically exhibited a wide, highly mobile channel, which could move over a mile from side to side over a relatively short time. Tr. 1254:21-1255:7 (Kelman); DX6035 (map of changing river channel).

47. Throughout recorded history, the Missouri River has also exhibited major flooding at unpredictable intervals. In 1881, major flooding occurred along the river. Tr. 1255:8-1256:4 (Kelman); DX5957 (photo of major flooding in 1881 near Council Bluffs, Iowa). In 1903, major flooding reached Kansas City. Tr. 1256:5-11 (Kelman); DX5958 (photo of major flooding in Kansas City). In 1927, major flooding occurred at several places along both the Missouri and Mississippi Rivers. Tr. 1258:4-11 (Kelman); DX6034 at 31 (photo of devastating 1927 floods). In the 1940s, there were several major and unpredictable floods causing damages well in excess of $100 million in 2020 dollars. Tr. 1261:16-1262:9 (Kelman); DX6039 at 19 (1944 photo showing extensive flooding near Adkins and Ideker properties). In 1951, yet another major flood, with the river swelling to over 12 miles wide and covering over 300,000 acres of land, made refugees of over 40,000 people, and caused damages of over $1.7 billion in 2020 dollars. Tr. 1262:24-1264:2 (Kelman); DX5959 (photo of 1951 flooding in Kansas City area). In 1952, people along the river again experienced catastrophic flooding. Tr. 1264:3-20 (Kelman); DX5976 (1952 photo showing flooding near Ideker property).

48. In addition to the major floods, people living alongside the river also were accustomed to smaller events that still had catastrophic impacts. Tr. 1256:12-25; 1266:5-10 (Kelman); DX5935 (1908 article describing bluff-to-bluff flooding near Kansas City). In 1915, the river rose intermittently, causing flooding in various locations. Tr. 1257:19-26 (Kelman).

49. "The entire Missouri valley between bluffs is subject to occupation by the river, which, in its unregulated state, is not stable but shifts its location by as much as a mile or more at frequent intervals." DX5685 at 3 (Corps official responding to complaints from landowners near Buffalo Hollow property after flooding in 1937); Tr. 1277:10-20 (Kelman).

50. In the 1940s, landowners in the vicinity of the Plaintiffs continued to experience unpredictable flooding. Tr. 1280:17-1283:25 (Kelman). In 1947, major flooding inundated thousands of acres of farmland, and the Kansas City Chamber of Commerce warned that nearly all farmers in the Missouri River bottomlands has lost their entire crops for the year as a result. Tr. 1282:23-1283:9 (Kelman).

51. In 1952, there was significant flooding all along the Missouri River. Tr. 1284:13-25 (Kelman); DX5975, DX5977, DX5978 (various photos of 1952 flooding). Throughout the 1950s, there was extensive public information about the risk of flooding and efforts to control the river, including many newspaper articles and public meetings. Tr. 1285:8-1286:2; 1287:2-4 (Kelman); DX5732 (1956 newspaper article regarding ongoing efforts to control flooding).

52. In the 1960s, flooding continued along the Missouri River in the areas near the Plaintiffs' properties. Tr. 1287:25-1289:13 (Kelman); DX5730 (1960 newspaper article regarding flooding of thousands of acres of bottomland).

53. During the dry decade of the 1930s, many people along the river began to farm the river bottomlands, gambling that they would benefit economically despite the risk of flooding. Tr. 1260:2-1261:5 (Kelman); DX5904 (1938 letter from Secretary of War Louis Johnson to Congressman Vincent Harrington regarding farming in Missouri River bottomland as a result of drought conditions in the region); DX5706 (1938 Omaha World Herald editorial regarding opportunistic farmers taking advantage of the bottomlands during drought years). Many of these

farmers were counting on the federal government to "bail them out" in their effort to gamble on bottomland farming along the banks of a flood-prone river. Tr. 1260:20-1261:11 (Kelman). After the Corps' efforts to control the river in the 1950s and 1960s, many more people purchased accreted land along the river, gambling again that the river would not flood them. Tr. 1265:6-1266:4 (Kelman). But the river continued to flood. Tr. 1266:3-10 (Kelman).

2. Examples of Flooding After Reservoirs Were Constructed and Fully Operational

54. The Corps has attempted to control flooding along the river for many decades, with only limited success: "efforts to try to control the river system, no matter how concerted those efforts may have been, would always prove exceptionally complicated. As often happened, the river system proved capricious." Tr. 1257:14-18 (Kelman).

55. Even after major steps to control the Missouri River, landowners near the Plaintiffs' properties remained concerned during the 1960s that the river was likely to continue flooding. Tr. 1287:19-24 (Kelman); DX5729 (newspaper editorial reflecting fear of flooding by people along the river). In 1964, the Corps posted a full-page newspaper notice alerting landowners of the need to improve levees as protection against flooding. Tr. 1289:4-8 (Kelman); DX5710 (1964 newspaper notice regarding ongoing threat of flooding).

56. In 1969, a magazine for landowners along the river warned of federal funding cuts which threatened the river improvements. Tr. 1289:21-1290:3 (Kelman); DX5735 (1969 magazine article describing cuts to funding for river improvements). The magazine for landowners along the river warned that the problem of Missouri River flooding might be impossible to solve. Tr. 1290:4-9 (Kelman).

57. In the 1970s, 1980s, and 1990s flooding continued along the Missouri River. Tr. 1290:10-1291:22; 1266:5-10 (Kelman); DX5744 (1971 notice of public meeting which warned

that flooding was inevitable, and referencing floods in 1962, 1964, 1965, and 1967). *See also* VII.E. After many years of flooding, and unsuccessful Corps efforts to prevent flooding, people living along the river suspected that the Corps would not be able to control the river. Tr. 1266:11-20 (Kelman). Even though at various points in history, members of the Corps would confidently proclaim that they would finally succeed in controlling the river and stopping all flooding, people living along the Missouri River generally knew that such proclamations were suspect. Tr. 1319:23-1321:2 (Kelman).

58. Dr. Kelman explained that "what we call the Missouri River is actually a riparian system of surpassing complexity, dynamism, and power. The river's behavior is difficult to predict and impossible to control. The Corps has done its best to tame a fundamentally irrepressible natural system, but it has never been able to stop the river from flooding entirely. In the area of the river associated with the Phase II Plaintiffs, the Missouri has overtopped its banks intermittently at uncertain intervals and for unpredictable durations. Proprietors, including the Phase II Plaintiffs, have had to accommodate themselves to the reality that the Corps, despite its best efforts, cannot entirely protect them from the flooding. Nature always bats last. The effort to control the Missouri, I'll suggest today, has a deep history, demonstrating the ways that people have for well over a century tried to capitalize on the region's natural advantages, finding the character of the land, the promise of commercial success." Tr. 1253:4-1254:2 (Kelman).

59. Dr. Kelman explained that "the history of the Missouri River system and its Basin is marked by more than a century and-a-half of struggles between different groups who have often had conflicting understandings of how best to exploit the natural resources around them, including the land upon which they live." Tr. 1251:20-1252:1 (Kelman); Tr. 1291:23-1292:3 (Kelman).

B. Plaintiffs' Properties Are Influenced by a Large, Uncontrolled Drainage Basin and Are Located in the Floodplain

60. Properties located below the System have always remained subject to flood risk, in part because of the large, uncontrolled drainage area below the reservoirs. There is over 165,000 square miles of unregulated drainage basin in the Missouri River that primarily impacts the lower river. Ph. I Tr. 6875:13-17 (Farhat). Flood risk increases significantly the further downstream a property is from the last dam, Gavins Point, as more tributaries drain into the river and because of the "travel time" it takes for a reduction in releases to influence a particular river stage downstream. Ph. I Tr. 6826:1-6827:6 (Farhat). ("Many times if we have a downstream flood event, if the rainfall occurs near the river, that peak has – that runoff or the local runoff has come into the river and left before a release change that we could make could reach that area to alleviate any of the flooding." Ph. I Tr. 6825: 19-24 (Farhat)). The court recognized unique characteristics of the lower basin. "The mainstem dams regulate only half of the Missouri River Basin." Trial Opin at 7. The court noted that the lower basin was subject to "high uncontrolled tributary flows." PX5 at USACE0121591. Trial Opin at 9.

61. In addition, many Plaintiffs' properties are located in what was previously part of the historic river channel and they are able to farm the land because it was accreted after construction of the BSNP. *See* Section VI.D. This includes all three Phase II Plaintiffs: Buffalo Hollow Farms, Ph. I Tr. 8007:8-21 (Remus), DX 1122-0007 & -0008; Ideker Farms Ph. I Tr. 8009:21-8010:6 (Remus), DX1122-0012 & -0013; and Adkins, Ph. I Tr. 8014:19–8015:1, 8015:15-17 (Remus), DX1122-0023 & -0024. The Court also recognized that several of the plaintiff properties involved in this litigation were created from accretion as a result of the BSNP. Trial Opin at 11-12.

62. In many instances, Plaintiffs' properties are located in areas where the pre-existing capacity of the River was so low that flows are likely to be exceed the in-banks capacity of the channel every two years. The reaches where the 50% annual exceedence probability flow is near or above the in-bank capacity are between approximately River Miles 420-425, 478, 505-518, 538-562, 573, 637, 658, 668, 680-683, and 692, which are near the Frakes, Buffalo Hollow Farms, Cunningham Farms, Saunders, Binder, Cunningham Trust, Drewes Farms, Ideker Farms, Garst, L& H Investments, Barnes, Schemmel, Hi-Tech Farms, Payne Valley Farms, KMJ Farms, Ettleman, George Neale Farm, Blodgett Farms, Olson, and Archer properties. DX3014-121, DX3014-122 (discharge profiles from Dr. Mussetter report).

C. Plaintiffs' Properties Are Located in a Basin with Dynamic Hydrology and Climate Conditions

63. The Missouri River Basin has wide variations between wet and dry conditions on a seasonal, annual, and multi-year basis, and by location within the basin. DX0559-0035 (2006 Master Manual, Section 3-05); DX0187-0004 (NOAA 2011 seasonal forecast assessment). Historically, annual average precipitation has varied widely throughout the basin, resulting in significantly differing volumes of runoff entering the river in the upper and lower basins in any given year, and large variations in amounts of runoff from year to year. Ph. I Tr. 6861:12-6862:9, 6865:18-19 (Farhat). Runoff also varies month to month, and within various reaches of the river, with wet and dry cycles apparent in hindsight, but not predictable in foresight. Ph. I Tr. 6869:1-19 (Farhat). Distinct period of prolonged drought occurred during the Dust Bowl era (1930-1940s), from the mid-1950s to early 1960s, from 1987-1992, and from 2000-2007, and high runoff years occurred in between those droughts. Ph. I Tr. 6865:18-6866:10 (Farhat).

64. On average, properties in the upper basin, where the reservoirs are located, receive less annual precipitation and there is less runoff into the river. Ph. I Tr. 6861:12-6862:9 (Farhat);

DX3001-31. The upper basin averages twenty-five million acre-feet of runoff annually, compared to the unregulated lower basin below Sioux City at forty-three million acre-feet, resulting in greater flood risk for the lower basin on average. Ph. I Tr. 6862:20-6863:14 (Farhat).

65. Interior drainage was a problem and concern expressed by landowners below Gavins Point to the Corps during the review of the master manual in the 1990s and even before, which was a result of uncontrolled drainage from tributaries below the mainstem reservoir system. Ph. I Tr. 13074:1-19 (Cieslik). Interior drainage is runoff that accumulates behind a leveed area. There are catchment areas on lands behind federal levees, which is where interior runoff accumulates, usually the lowest points in the floodplain, before it can go through the levee and drain into the river. Interior runoff is collected through a series of ditches, either natural or manmade, that routes the interior runoff to outlet structures. Ph. I Tr. 8081:12-8082:12 (Remus). All levees also have ponding areas, and some are actually designated in the levee's O&M manual. Ph. I Tr. 8082:14-25; 8084:14-8085:4 (Remus). Levee districts are on notice that ponding areas have a restricted use and should not allow encroachment that will limit their use as published in CFR 33.208.10. Ph. I Tr. 8083:4–8084:2 (Remus), DX 890 (L-627-624 O&M Manual, 1981). There are numerous representative Plaintiffs whose land is located behind a federal levee with interior drainage structures in the vicinity, to include Phase II plaintiff Mr. Adkins behind L-627-624. Ph. I Tr. 8195:7-8209-23, (Remus); DX904 (R-616 O&M Manual); DX903 (L-611-614 O&M Manual); DX907 (L-594 O&M Manual); DX888 (L-575 O&M Manual); and DX894 (R-562 O&M Manual).

66. Various observers of the Missouri River recognized that in recent decades river levels have been high, leaving property along the river prone to flooding. Mr. Mark Anderson, a scientist with the USGS, testified about a study he published analyzing streamflow trends for the

Missouri River basin from 1960 to 2011, documenting gages that showed an increasing trend of water per year coming out of the basin. Ph. I Tr. 7228.23-7229:11 (Anderson); DX3008-13 & -14; DX1289 (USGS Streamflow Trend Report). The study identified "remarkable increases" in flows from the eastern Dakota region, identifying streams that are now carrying more water than before and delivering that water into the unregulated Missouri River channel below Gavins Point Dam. Ph. I Tr. 7229:24-7230:13 (Anderson). The increases to the James and Big Sioux Rivers are the largest in the United States. Ph. I Tr. 7267:20-21 (Anderson). From 1960 to 1969, the average volume of water per year for the James River was 42,581 acre-feet, yet it increased to 142,898 acre-feet for the period 2003 through 2012. Ph. I Tr. 7253:19-7254:22 (Anderson). Mr. Anderson explained in one decade "that represents a difference of a little over 100,000 acre-feet per year that's now being delivered to the Missouri River that wasn't, didn't used to be delivered to the Missouri River." Ph. I Tr. 7254:24-7255:4 (Anderson). "From a hydrology standpoint, that's significant in another way . . . now that that channel is having to carry three, four times more water than it used to . . . the channel has got to figure out how to take care of that much water and sometimes that means erosion and so on." Ph. I Tr. 7255:9-17 (Anderson). Similar findings were made for the Big Sioux (an increase in annual volume of runoff of 97,121 acre-feet per year), the Little Sioux (an increase of 55,000 acre-feet per year), and the Platte River (annual increase of over 117,000 acre-feet per year). Ph. I Tr. 7259:2-14, 7261:14-24, 7263:12-22 (Anderson); DX3008-30, 3008-36, DX3008-41.

67. Over time, changes in basin hydrology have also decreased levels of protection provided to Plaintiffs by levees. The federal levees in the Omaha to Rulo reach of the river, mostly agricultural, built from the late 1940s to 1970, were studied by the Corps for adequacy in 1986. Ph. I Tr. 8069:9-8070:2 (Remus); DX1162 (Adequacy of MR Levee System). The original

hydrology based on data available at the time was updated and the study concluded that there had been a general decrease in the level of protection for most of the levee systems associated with Plaintiffs in this reach. Ph. I Tr. 8069:19-23 (Remus). For example, the portion of L-611-614 below the Platte River dropped from the 500- to the 200-year level of protection from the 1961 to 1984 hydrology Ph. I Tr. 8077:6-9 (Remus), DX3004-94.

D. Plaintiffs Themselves Knew or Should Have Known Their Properties Are Subject to Flooding

68. Dr. Hromadka's testimony from Phase I summarized past flooding Phase II Plaintiffs recalled at their properties. Adkins recalled "prior flooding in 1984, 1993, 1995, and '96 – all with blocked drainage and seepage." Ph. I Tr. 5283:13-15 (Hrmodka). Ideker flooding history included 1952, prior to acquisition by the Ideker family; 1962 and 1967, all prior to the dams becoming operational; and then in 1984 and 1993. Ph. I Tr. 5421: 11-14 (Hrmodka). And prior flooding at Buffalo Hollow was listed for 1952, 1973, 1984, and 1993. Ph. I Tr. 5455:21-22. (Hrmodka).

69. Producers, like the Plaintiffs, should know if their land has been designated high risk by the Risk Management Agency ("RMA") because the maps are publicly available, insurance agents communicate special rating considerations like high-risk areas to producers, a high-risk designation is accounted for in insurance quotes, and high-risk designations are made explicit on the acreage report and summary of insurance that producers physically sign. Tr. 2670:22-2671:13 (Zanoni).

1. Adkins

70. Adkins property is in historic riverbed. Tr. 8015:15-17 (Remus). The property consists largely of accreted land that was created only after the Corps took steps to manage the river. Tr.

1267:1-1268:6 (Kelman). Compare DX5790 (photo of Adkins property during 1993 flood) with DX5794 (modern photo of Adkins property showing accreted lands in floodplain).

71. The Adkins family has held their property for many generations, since the 1870s, and so should be well aware of historic flooding and the ongoing flood risks. Tr. 1268:7-22 (Kelman); Tr. 1425, 1432, 1440 (describing Adkins family history on the land). The Adkins property has always been subject to significant and unpredictable flooding. Tr. 1267:1-1268:6 (Kelman); compare DX5790 (photo of Adkins property during 1993 flood) with DX5794 (modern photo of Adkins property showing accreted lands in floodplain).

72. The Adkins property likely faced major flooding in the 1881 flood. Tr. 1255:25-1256:4 (Kelman); DX5957 (photo of major flooding in 1881 near Council Bluffs, Iowa). In 1937, several members of the Adkins family, along with other property owners from Pottawattomie, Mills and Fremont Counties, requested federal government relief because of flooding in the area. Tr. 1272:12-1274:5 (Kelman); DX5703 and DX5700 (1937 petitions seeking federal compensation for flooding affecting Adkins property).

73. The Adkins property faced significant flooding again in the 1940s. Tr. 1262:2-5 (Kelman); DX6039 at 19 (1944 photo showing extensive flooding near Adkins and Ideker properties). In the 1940s, members of the Adkins family argued with the Corps over placement of levees meant to protect their property and others' from floods. Tr. 1281:5-1282:22 (Kelman). In 1945, farmers near the Adkins property requested flood assistance from the Corps. Tr. 1280:23-25 (Kelman).

74. In the late 1950s, landowners near the Adkins property participated in public meetings, during which they argued the Corps should be responsible for maintaining protective structures to shield their farms against flooding and also be responsible for compensating farmers when the

river flooded. Tr. 1287:5-18 (Kelman); DX5742 (describing public meeting with landowners near Adkins property regarding flood protection and flooding in the area).

75. In the 1960s, bottomland near the Adkins property flooded, destroying land and ruining crops. Tr. 1288:12-15 (Kelman). In 1962, Corps engineers continued efforts to maintain the levee near the Adkins property, showing that the river remained a threat. Tr. 1288:24-1289:3 (Kelman); DX5711 (1962 Corps memo regarding local cooperation in levee repair).

76. The Adkins property also faced major flooding in 1993. Tr. 1266:11-14 (Kelman); DX4096 (1993 photo from Council Bluffs newspaper, showing Ken Adkins "surveying damage at [the Adkins] home").

77. The Adkins property flooded in 1967, 1984, 1993, and 1995. Tr. 57:8-16 (Adkins Partnership). There are "a lot" of areas on the property that are more prone to flooding and flooding history is always an important consideration in acquiring land because it is "part of the challenge of buying land down along the river." 01/28/2020 Dep. Tr. 135:23-136:1, 136:6-11, 140:7-13 (Adkins Partnership), ECF No. 632 Ex.1. Water does not have to go through a floodgate or under a levee to flood the property; the low-lying areas and height of water in the bend of the river contribute to the flooding through ground water connection. *Id.* at 136:20-138:3.

78. The portion of the Adkins & Sons representative property riverward of the levee was designated by the RMA as high-risk, requiring a special insurance rate as early as 1989. Tr. 2672:16-2673: 9 (Zanoni); DX5482 at 7 (Pottawattamie County high risk map 1989); DX7008-41 (image of property on county high risk map).

79. The Adkins property has also been characterized by the Federal Emergency Management Agency ("FEMA") as in a floodway. The FEMA flood zone applicable to the Adkins property,

or portions thereof, is the AE Floodway. Joint Stip. of Fact, ECF No. 187, Ex. 1 at 15. The AE Floodway is an area between the zone AE boundary and the floodway and is an encroachment area, and FEMA regulations prohibit encroachment, or development, in that floodway. Ph. I Tr. 10683:2-10684:6 (Rodriguez).

2. Buffalo Hollow

80. Buffalo Hollow is in historic riverbed. Ph. I Tr. 2342:9-25 (Schneider); Ph. I Tr. 8007:16-21 (Remus). The Buffalo Hollow property consists, in significant part, of accreted land resulting from Corps activities. Tr. 1270:24-1271:10 (Kelman); DX6039 at 3 (1934 photo showing erosion at Buffalo Hollow property before Corps constructed dikes); DX6039 at 4 (1935 photo showing accretion of land beginning after construction of dikes at Buffalo Hollow property); DX6039 at 5 (1942 photo showing fully accreted land formed and ready for farming at Buffalo Hollow property).

81. The Schneider family has held their Buffalo Hollow property for multiple generations, since at least 1962, and so should be well aware of historic flooding and the ongoing flood risks. Tr. 1270:18-1271:24 (Kelman); DX5962 at 2 (1936 Corps map of Buffalo Hollow property); Ph. I Tr. 2291, 2301, 2303 (Phase I testimony from Ron Schneider). The family's awareness of the flood-prone nature of their property is demonstrated by its construction and maintenance of dikes and levees. Tr. 1271:2-12 (Kelman); *see also* Tr. 146:16-21 (Buffalo Hollow) (discussing the construction and completion of their private levee).

82. In the late 1930s and early 1940s, landowners right across the river from the Buffalo Hollow property were actively complaining that the Corps was responsible for the flooding they had faced, and even suing the Corps. Tr. 1274:16-1278:12 (Kelman); DX3796 (1937 letter about landowner complaints of flooding near Buffalo Hollow site); DX5979, DX5716, DX5715, DX5855 at 3 (materials reflecting landowners and their lawyer seeking takings compensation

from federal government for flooding near Buffalo Hollow property). In the 1940s, farmers near the Buffalo Hollow property reported crops lost to river flooding. Tr. 1281:1-4 (Kelman).

83. The Buffalo Hollow property flooded in 1952, 1967, 1973, 1984, and 1993. Tr. 146:23-147:1 (Buffalo Hollow). Buffalo Hollow Ranch records also indicated that excess water on the property prevented planting in 1997. 01/27/2020 Dep. Tr. 241:16-242:12 (Buffalo Hollow), ECF No. 632, Ex. 3. Buffalo Hollow admits that the property experienced seepage before 2007. Tr. 147:5-6 (Buffalo Hollow). Schneider described damage from flooding at Buffalo Hollow in years following 2007 as "a little more" than in previous years. Ph. I Tr. 2313:24-2314:24 (Schneider).

84. The area of the Buffalo Hollow Farms Inc. representative property that is not in the bluffs was designated by RMA as high-risk requiring a special insurance rate as early as 2000. Tr. 2676:11-21 (Zanoni); DX 5483 (Doniphan County high risk Map 2000); DX7008-55 (image of property on county high risk map). Buffalo Hollows agrees that the RMA crop insurance rate maps would inform expectations about flood risk. 01/27/2020 Dep. Tr. 229:4-9 (Buffalo Hollow). They know that the rating maps exist, RMA considers the unaggregated crop insurance rates for land outside the levee to be Triple B, and that their insurance agent has the maps, but has never seen or asked to see a RMA rating map. *Id.* at 226:7-19, 228:15-229:24 (Buffalo Hollow).

85. The Buffalo Hollow property has been characterized by FEMA as in a floodway. The FEMA flood zone applicable to the Buffalo Hallow property, or portions thereof, is A. Joint Stip.of Fact, ECF No. 187, Ex. 1 at 17. Flood Zone A is the special flood hazard area or the area that is subject to the base flood, or commonly referred to as the hundred-year flood, which is a flood that has a 1 percent chance of being equaled or exceeded in any given year. Ph. I Tr.

10693:24-10694:3; 10681:9-17 (Rodriguez). Zone A is also an area where FEMA has established a boundary of the flood hazard, but hasn't identified a base flood elevation with it. Ph I Tr. 10681:18-22 (Rodriguez).

3. Ideker

86. Ideker is in historic riverbed. Ph. I Tr. 8009:21–8010:6 (Remus). The Ideker property consists, in significant part, of accreted land resulting from Corps activities. Tr. 1269:15-19 (Kelman); DX5961 at 2 (Corps map reflecting Ideker property in connection with 1936 construction of dikes).

87. The Ideker family has held their property for multiple generations, since at least 1952, and so should be well aware of historic flooding and the ongoing flood risks. Tr. 1268:23-1270:17 (Kelman); see also DX6038 at 3 (photo reflecting Ideker property after Corps construction of dikes); DX5961 at 2 (Corps map reflecting Ideker property in connection with 1936 construction of dikes); Ph. I Tr. 4112-13 (Phase I testimony regarding Ideker family awareness of flooding at time of property purchase).

88. In the 1950s, when Ideker's father purchased the property, he was aware of its potential for flooding, and was gambling on the future steps he hoped the Corps would take to control the river. Tr. 1270:3-17 (Kelman). When Roger Ideker's parents originally acquired the property in 1952, the land "had been prone to flooding, was not farmable," and that "because of the flooding" his father "purchased the property at a favorable price." Tr. 221:19-23 (Ideker Farms). The Ideker family's awareness of the flood-prone nature of their property is further demonstrated by its construction and maintenance of dikes and levees. Tr. 1269:15-22 (Kelman).

89. In the 1920s and 1930s, a neighbor of the Ideker property demanded that the Corps provide more flood protection for his property. Tr. 1278:3-1280:6 (Kelman). In 1937, farmers

living near the Ideker property requested federal government relief because of flooding in the area. Tr. 1274:6-8 (Kelman).

90. In 1949, the Corps helped finance repairs to a levee near the Ideker property, showing that the Ideker property was still susceptible to flooding. Tr. 1283:21-25 (Kelman). And in the the 1950s, the Ideker family was bidding for government contracts to work on a river levee in Rulo, Nebraska, demonstrating that the Ideker family remained keenly aware of the Missouri River's propensity to flood. Tr. 1284:7-12 (Kelman); DX5685 (documents reflecting 1953 Ideker family bid for contract to work on levee).

91. In 1952, there was catastrophic flooding near the Ideker property. Tr. 1264:3-20 (Kelman); DX5976 (1952 photo showing flooding near Ideker property). In 1953, the Ideker family again sought work from the Corps, to work on an agricultural levee, once again showing that they were aware of the ongoing risk of flooding that required such levees. Tr. 1285:4-7 (Kelman); DX5679 (referring to Ideker bid for levee work). Then in 1958, the Ideker family complained that the river was eroding their riparian property, and that the dikes were not adequately protecting the property from the river. Tr. 1286:6-22 (Kelman); DX5681 at 2 (1958 Ideker letter to Corps); DX5691 at 2 (locations of dikes about which Ideker was complaining in 1958); DX5682 (1958 Corps' response to Ideker complaints about flooding on his property).

92. In 1981, a public study by the Missouri Basin States Association specifically identified the Ideker property as one facing considerable risk of flooding, and noted that the Ideker levee was highly vulnerable to relatively common episodes of high water. Tr. 1291:5-22 (Kelman); DX5696 at 28 (1981 study identifying Ideker property and its levee as vulnerable to frequent flooding).

93. When Ideker Farms, Inc. acquired the representative property in 1972, Roger Ideker failed to consult any documents, take any measure to investigate, nor communicate with any local, state, or federal government regarding flood risk. 01/29/2020 Dep. Tr. 84:7-16 (Ideker Farms), ECF No. 632, Ex. 2. Ideker believed that "[w]hen you're on a river bottom, you're always concerned about flood risk." *Id.* at 83:23-84:16 (Ideker Farms). Prior to 2004, the farm flooded in 1952, 1962, 1967, 1984, and 1993. Tr. 261:8-11 (Ideker Farms). Additionally, there "may have been" other times in the 1990's when Ideker Farms was unable to plant crops because of flooding on the property. 01/29/2020 Dep. Tr. 68:11-20 (Ideker Farms). Roger Ideker also conceded his representative property experienced interior drainage or blocked drainage before 2000, whenever the river was high and the flap gates would close, and while he believes that occurs more frequently now he has no logs and did not track occurrences over time. Ph. I Tr. 4190:6-4191:12 (Ideker).

94. Overbank water seepage during high river levels occurred on the southern part of his property in 1984 and 1993, prior to the United States' acquisition of the Thurnau Mitigation Site which occurred in 2004, according to Mr. Ideker. Tr. 290:17-291:4 (Ideker Farms). Mr. Ideker stated the flooding in 1984 resulted from water backing up from their neighbor's property to the southeast, which the Corps did not purchase until 2006 for the Thurnau Mitigation Site. Ph. I Tr. 4134:9-14 (Ideker). The high river events of 1993 resulted in sand deposits on the property, total destruction of the irrigation equipment, and total crop loss. Tr. 293:19-294:5 (Ideker Farms). Similar high river level events and overbank water seepage also occurred to the south of the Ideker property in 2007, 2008, and 2010 following the acquisition of the Thurnau Mitigation Site. Tr. 290:17-20 (Ideker Farms); *see also* 01/29/2020 Dep. Tr. 140:9-10; 142:4-5 (Ideker Farms).

95. The portion of the Ideker Farms Inc. representative property riverward of the levee was designated by RMA as high-risk requiring a special insurance rate as early as 1995. Tr. 2675:5-16 (Zanoni); DX5486 (Holt County high risk map 1995); DX7008-49 (image of property on county high risk map).

96. The Ideker property has been characterized by FEMA as in a floodway. The FEMA flood zones applicable to the Ideker property, or portions thereof, are the AE and AE Floodway. Joint Stip. of Fact, ECF No. 187, Ex. 1 at 16. Flood zone AE is an area that's subject to inundation by the one percent annual chance flood event, also referred to as the base flood or commonly referred to as the hundred-year flood, which is a flood that has a one percent chance of being equaled or exceeded in any given year. Ph. I Tr. 10681:6-17 (Rodriguez). Zone AE is also a special flood hazard area where FEMA has taken a more rigorous engineering approach and has established base flood elevations within that area. *Id.* at 10682:13-18 (Rodriguez). The AE Floodway is an area between the zone AE boundary and the floodway and is an encroachment area, and FEMA regulations prohibit encroachment, or development, in that floodway. *Id.* at 10683:2–10684:6 (Rodriguez).

E. United States Department of Agriculture ("USDA") RMA Crop Insurance Records Show that Plaintiffs' Properties Flooded Regularly Before the MRRP

97. The Federal Crop insurance Corporation ("FCIC") is a government corporation within the USDA authorized to carry out the programs of the Federal Crop Insurance Act, 7 U.S.C. § 1502. Tr. 2655:15-19 (Zanoni). The USDA RMA, acts on behalf of the FCIC to administer all Federal crop Insurance programs. *Id.* at Tr. 2657:9-11 (Zanoni). RMA produces actuarial maps for each county and maintains data related to each producers crop yield and crop insurance claims. Tr. 2657:18-22 (Zanoni). Policy holder information ("PHI") reports are reports produced from data reported to RMA by insurance companies and stored in databases. Tr. 2658:21–2659:7

(Zanoni). They show most of the data from the early 1990s to the present maintained by RMA for a given policy by crop and year. *Id.* The cause of loss for a crop insurance claim is identified on the PHI report and can be determined by utilizing a key. Tr. 2660:18-21 (Zanoni); DX5464 (Cause of loss key). "Code 31 describes losses due to excess moisture" and "[c]ode 51 describes losses due to flooding." Tr. 2660:22-25 (Zanoni); *See also* DX5464 (Cause of loss key). RMA considers flooding and excess moisture causes of loss to be "functionally the same." Tr. 2661:1-2 (Zanoni).

1. History of Flooding or Excess Moisture Claims Made on the Adkins Property

98. The Adkins & Sons Partnership made claims in five years during the 1990s. First, a claim for the loss of corn due to excess moisture on the representative property in 1992. Tr. 2662:4-6 (Zanoni); DX4181 at 3 (Adkins PHI 1992 -1999). Second, claims for the loss of soybeans due to excess moisture on the representative in 1993. Tr. 2662:25–2663:5 (Zanoni); DX4181 at 69 and 71-73 (Adkins PHI 1992 -1999). Third, a claim for the loss of corn due to excess moisture on the representative property in 1995. Tr. 2663:10-17 (Zanoni); DX4181 at 25 and 27 (Adkins PHI 1992 -1999). Fourth, the partnership made 21 claims for loss of corn and soybeans due to excess moisture on land farmed in Pottawattamie County, Iowa, where the representative property is located, in 1998. Because the PHI from is missing the Land ID information RMA cannot determine the exact location of the claims. Tr. 2663:18–2664:5 (Zanoni); DX4181 at 41-44 and 101-103 (Adkins PHI 1992 -1999). Fifth, claims for loss of corn and soybeans due to excess moisture on the representative property in 1999. Tr. 2664:6-17 (Zanoni); DX4181 at 49 -51 and 109 (Adkins PHI 1992 -1999).

99. The Adkins & Sons Partnership made claims in two years during the from 2000-2003. First, claims for loss of soybeans due to excess moisture on the representative property in 2001.

Tr. 2664:18-23 (Zanoni); DX5458 at 127-129 (Adkins PHI 2000-2018). Second, claims for loss of corn due to excess moisture on the representative property in 2003. Tr. 2664:24–2665:6 (Zanoni); DX4664 at 21-23(Adkins PHI 2000-2018).

2. History of Flooding or Excess Moisture Claims Made on the Ideker Property

100. Ideker Farms Inc. made claims in five years during the 1990s. First, it made three claims for loss of corn and soybeans due to excess moisture / flooding on the representative property in 1996. Tr. 2666:17–2667:9 (Zanoni); DX4672-3 and 15 (Ideker PHI 1995-1999). Second, it made two claims for loss of corn and four claims for the loss of soybeans due to excess moisture on property in Holt County, Mo, where the representative property is located in 1997. But because the land ID is missing RMA cannot determine whether or not the claims were made for the representative property. Tr. 2667:10-18 (Zanoni); DX4672 at 5 and 19 (Ideker PHI 1995-1999). Third, it made two claims for loss of corn due to excess moisture on land farmed in Holt County, Missouri, where the representative property is located, in 1998. Because the PHI from is missing the Land ID information RMA cannot determine the exact location of the claims. Tr. 2667:19-22 (Zanoni); DX4672 at 7 (Ideker PHI 1995-1999). Fifth, it made claims for loss of corn and soybeans due to excess moisture on the representative property in 1999. Tr. 2667:23–2668:11 (Zanoni); DX4672 at 9-11 and 23 (Ideker PHI 1995-1999).

101. Ideker Farms Inc. made a claim for lost corn due to excess moisture on the representative property in 2001. Tr. 2668:12-16 (Zanoni); DX4891 at 4 (Ideker PHI 2000-2018).

3. History of Flooding or Excess Moisture Claims Made on the Buffalo Hollow Property

102. Buffalo Hollow Farms Inc. made claims in three years during the 1990s. First, it made a claim for lost corn due to excess moisture and flooding on the representative property in 1993. Tr. 2669:9-14 (Zanoni); DX4670 at 29 (Buffalo Hollow PHI 1989-1999). Second, it made a

claims for lost corn due to excess moisture on the representative property in 1995. Tr 2669:15-21 (Zanoni); DX4670 at 11-13 (Buffalo Hollow PHI 1989-1999). Third, it made a claims for loss of soybeans due to excess moisture on land farmed in Doniphan County, Kansas, where the representative property is located, in 1999. Because the PHI from is missing the Land ID information RMA cannot determine the exact location of the claims. Tr. 2669:22-2670:2 (Zanoni); DX4670 at 43 (Buffalo Hollow PHI 1989-1999).

VII. Reasonable Investment-Backed Expectations: Plaintiffs' Investments in their Properties Were Not Based on Any Reasonable Expectation that Has Been Disrupted by the United States' Activities

103. As discussed below, the focal point for evaluating reasonable investment backed expectations is the time of acquisition. *See* discussion *infra* Part XIII Section A. Plaintiffs provide a paucity of information as to their alleged investments in the property at the time of acquisition, and instead provide yearly business operation costs and improvements to the land since acquisition that further their farming businesses. Indeed, because they inherited significant portions of the properties, most of Plaintiffs' asserted investment was in the form of routine upkeep and business expenditures.

104. For each plaintiff, flooding was anticipated and expected at the time of acquisition. Tr. 97:21-24, 98:2-5 (Adkins Partnership); 01/28/2020 Dep. Tr. 64:16-20 (Adkins Partnership); 01/27/2020 Dep. Tr. 68:2-3 (Buffalo Hollow); 01/29/2020 Dep. Tr. 57:14-19, 63:12-13, 83:23-84:16, 85:4-86:86:20 (Ideker Farms).

105. Adkins testified that they have invested in the land since acquisition, and further invested by acquiring additional land, but did not provide specific information about their investments at the time of acquisition. Tr. 79:21-24 (Adkins Partnership).

106. Since acquisition, to further their farming business operations, the Partnership has allegedly built grain bins, buildings, and dug small ditches. 01/28/2020 Dep. Tr. 129:18-24, 130:8-10 (Adkins Partnership).

107. The L-627 levee protects a substantial portion of the Adkins property.[5] Tr. 47:3-6 (Adkins); *see also* Ph. I Tr. 2090:6-14 (Flere).

108. Although the Schneider family purchased the Buffalo Hollow representative property in 1973, Buffalo Hollow Farms, Inc. did not acquire the property until 2008. Tr. 171:13-23 (Buffalo Hollow).

109. A private levee was built at the representative property in 1968. Tr. 146:16-19 (Buffalo Hollow).

110. Buffalo Hollow testified that they invested in the land and have invested since acquisition, but did not provide specific information about their investments at the time of acquisition. Tr. 146:6-8 (Buffalo Hollow).

111. Since acquisition, to further their farming business operations, Buffalo Hollow has allegedly improved drainage, filled low-lying areas, dug ditches, and pumped out water. Tr.147:22-148:3 (Buffalo Hollow). They also purchased heavy machinery to further their quarry operation and used this equipment to improve their levee and fill scour holes. *Id.* at 148:17-149:5 (Buffalo Hollow). It supposedly costs Buffalo Hollow Farms approximately $670 per acre to

[5] Before 2010, there was a lack of maintenance of the drainage structures that drain the Adkins property through the levee. *See* Ph. I Tr. 12091:2-18, 12092:10-22 (Flere) (2010 periodic inspection found flap gates wedged open, a corrugated metal pipe, and a flap gate that was wedged open from sediment or debris). Repairing the floodgates after the 2011 flood resulted in a noticeable difference during the 2014 flood; he noticed there was less water coming through the levees than before.

plant corn on 579 acres and $450 per acre to plant beans on 248 acres per year. *Id.* at 149:11-14 (Buffalo Hollow).

112. Although the Ideker family purchased the representative property in 1952, Ideker Farms, Inc. did not acquire the property until 1972. Tr. 221:5-8, 10-11 (Ideker Farms). A private levee was built there in the 1960s. *Id.* at 225:2-9 (Ideker Farms).

113. Since acquisition, to further their farming business operations, Ideker Farms has allegedly built a farm home, river home, and shop; improved the land with grain bins, implement buildings, fuel tanks, irrigation equipment; and constructed drainage ditches, drainage conduits, and dug wells for irrigation. Tr. 218:19-23, 225:21-226:2 (Ideker Farms). It supposedly costs Ideker Farms approximately $750 per acre to plant corn on 645 acres and $550 per acre to plant soybeans on 733 acres per year. *Id.* at 226:15-19 (Ideker Farms).

114. Notably, none of the Plaintiffs put in evidence suggesting that these business investments to construct improvements on the properties have been harmed by the intermittent and incremental flooding.

A. Plaintiff's Stated Expectations for their Properties

115. Extensive evidence shows that Plaintiffs' expectations for their respective properties were to conduct farming. Reasonable expectations for farming on these properties must take into account the constant threat of flooding that these properties have historically faced.

116. When Plaintiffs acquired their properties, they intended to farm the land, but did not have any specific profit expectations. 01/28/2020 Dep. Tr. 43:8-16, 45:17-20 (Adkins); 01/27/2020 Dep. Tr. 25:14-21, 36:21-3 (Buffalo Hollow); 01/29/2020 Dep. Tr. 59:1-10, 59:11-16 (Ideker).

117. Plaintiffs knew that crop yields would always vary based on the weather. Tr. 92:25-93:12, 95:14-18, 96:21-97:6 (Adkins) 01/28/2020 Dep. Tr. 46:9-15. (Adkins); 01/27/2020 Dep. Tr. 30:13-18, 36:7-18, 80:2-6 (Buffalo Hollow); 01/29/2020 Dep. Tr. 59:17-19 (Ideker).

118. Plaintiffs admit that their properties had a history of flooding and that flooding would likely continue into the future. Tr. 97:21-24, 98:2-5 (Adkins); 01/28/2020 Dep. Tr. 64:16-20 (Adkins); 01/27/2020 Dep. Tr. 68:2-3 (Buffalo Hollow).

119. Plaintiffs did not investigate flood risk on their properties, nor how the physical structures were going to provide protection moving forward. *Compare* Tr. 79:8-13 (Adkins), *and* Tr. 222:14-19 (Ideker Farms), *with* 01/28/2020 Dep. Tr. 138:17-139:1, 169:3-16 (Adkins), *and* 01/29/2020 Dep. Tr. 83:23-84:16, 103:24-104:7 (Ideker). *See also* 01/27/2020 Dep. Tr. 68:12-15, 69:3-5, 70:8-13, 96:13-22 (Buffalo Hollow).

120. If the Plaintiffs could go back in time to when they first acquired their properties with the knowledge they have today concerning flood risk and crop productivity on their properties, they all would have still acquired the land. 01/28/2020 Dep. Tr. 143:3-14 (Adkins); 01/27/2020 Dep. Tr. 68:5-11 (Buffalo Hollow); 01/29/2020 Dep. Tr. 86:5-15, 86:16-20 (Ideker).

121. All three properties are currently used for and will continue to be used for farming. 01/28/2020 Dep. Tr. 283:14-284:23 (Adkins); 01/27/2020 Dep. Tr. 271:6-9 (Buffalo Hollow); 01/29/2020 Dep. Tr. 38:3-17, 40:9-11 (Ideker).

B. Residual Flood Risks from Omaha to St. Joseph and the Potential for Operational Changes Were Well-Known

122. Since the construction of the System, the Corps has consistently described to the public in its Master Manuals, the first published in 1960, annual reports and public meetings, and post flood reports, how flood risk still remains in the reach from Omaha to St. Joseph. Tr. 1360:12–1361:21, 1365:21–23 (Remus). For example, in the 1975 and 1979 Master Manuals, the Corps stated that because of "the storage evacuation requirements, the long travel times involved to the lower basin damage centers and the lack of reliable quantitative rainfall forecasts for several days in advance," flooding "can continue to be expected, particularly in the downstream portions of

the basin," and that "there may even be occasions when system operations augment downstream flood events." Tr. 1366:13–22 (Remus) (quoting DX428 ¶ 11-30).

123. Other Corps publications and reports have included similar statements since at least the 1970s. Tr. 1432:21–1433:11 (Pridal) (1972 Stage Trend report stating that between Nebraska City and St. Joseph, "the probable frequency of overbank flooding is greatly increased and the problem has also been worsened in the past twenty years by increased utilization of low-lying flood plain areas," and that "[t]h[e] reduced channel capacity also makes flood control operation of the main stem and tributary reservoirs more difficult and less effective" (quoting DX5029-0005); Tr. 1507:7–14 (Shumate) (at 1975 public meeting in the Kansas City district, Corps representative pointed out that floods in 1973 had peak flows only fifty percent to seventy percent as large as floods with similar the crest stages in the 1950s (DX5353-0001)); Tr. 1513:11–15 (Shumate) (1981 Floodplain River Stage and Levee Inventory, DX4853-0035).

124. In a variety of publications, the Corps has long explained that even with the system in place, low-lying properties in the reach from Omaha to St. Joseph could be "vulnerable to flooding caused by rapid rises from tributary inflow downstream of Gavins Point Dam." Tr. 1510:22–24 (Shumate) (quoting DX4853-0014); *see also* Tr. 1438:21–1439:4 (Pridal) (citing DX4537-0007); Tr. 1446:7–14 (Pridal) (citing DX5011-0001).

125. Similarly, the Corps has routinely described how properties along the river periodically experience drainage problems, and how natural forces have exacerbating those issues over time between Nebraska City and St. Joseph since the river was channelized. Tr. 1440:9–14 (Pridal) ("Interior drainage problems occur in [the Nebraska City] area and have worsened due to increasing river stages at above normal flow levels." (quoting DX5025-0010)); Tr. 1455:7–24 (Pridal) (discussing 1986 Levee Adequacy Study, DX1162 §§ I.A, V.A); Tr. 1457:3–17 (Pridal)

(2004 master manual statement that in the reach from Nebraska City to St. Joseph, "[d]eterioration of the channel capacity has occurred throughout this reach" such that "mid-summer flows exceeding 90,000 cfs will result in river levels above flood stage," with "[d]amage due to high groundwater and interior drainage behind levees in cultivated fields begin[ning] at stages two or more feet below flood stage" (quoting DX5013 ¶ 7-07.3.7)).

126. The Corps regularly updated its reports and publications throughout the 1970s, 1980s, 1990s, and early 2000s, repeating and expanding on its earlier public statements about continuing flood risk. Tr. 1367–68 (Remus) (1979, 2004, and 2006 Master Manuals)); Tr. 1435–44 (Pridal) (1975, 1985, 1998, and 2004 stage trend reports). The Corps also produced inundation mapping in the late 1970s showing that portions of the Adkins and Ideker Farms properties would be inundated in a 100-year flood event. Tr. 1446:23–1447:1, 1447:17–19 (Pridal) (citing DX4847-0009). And the Corps developed flow profiles at each river mile for the 2003 Flow Frequency Study. Tr. 1449:14–1450:24 (Pridal) (discussing DX1097, DX1202).

127. The 2003 Flow Frequency study involved substantial public outreach starting in the 1990s. Tr. 1447:21–1452:6 (Pridal); Tr. 173:19–174:12 (Buffalo Hollow) (discussing DX5312 (outreach letter from the Corps kept in Buffalo Hollow's files). Indeed, Mr. Schneider's father received a document in 1997 from the Corps that describes how the "Corps of Engineers in partnership with federal and state agencies has initiated a study to develop flow frequencies for the mainstem upper Mississippi, Lower Missouri and Illinois Rivers." Tr. 173:15-22 (Buffalo Hollow); *see also* DX5312 (Flow Frequency Study Notice of Initiation and Public Involvement Newsletter). This newsletter also explained a public involvement program and how newsletters would be developed to inform all interested persons of the study's progress and preliminary results. Tr. 174:5-14 (Buffalo Hollow); *see also* DX5312 (Flow Frequency Study Notice of

Initiation and Public Involvement Newsletter). Additionally, the newsletter included two major studies that were conducted after the 1993 flood to examine the flooding on the upper Mississippi and lower Missouri Rivers. Tr. 174:15-22 (Buffalo Hollow). Mr. Schneider never read any of the studies. *Id.* at 174:23-175:9. His father also received a study update in 2003 that informed him that the flow frequency study would be compete on June 30, 2003 and that the results of the study would be available to the public at open houses. Tr. 175:15-21, 176:4-22 (Buffalo Hollow); *see also* DX5314 (Public Involvement Newsletter).

128. The Corps also kept the public informed about how ongoing BSNP maintenance and the riverine habitat program (which began in 1975) could result in future modifications to the BSNP, including the notching of structures. Tr. 1464:8–1465:17, 1467:24–1469:4 (Pridal) (discussing DX5012-0002, -0018; DX405-0013 to -0014, -0072 to -0081)).

129. Likewise, as early as 1960, the Corps explained in its master manual that its operation of the mainstem system could not be expected to remain entirely fixed in the future. Tr. 1363:16–21 (Remus) (citing PX0006 ¶ 5-23); *see also* Tr. 1364:10–19 (Remus) (1975 and 1979 master manual statements that "the mainstem system will be operated to achieve the maximum possible overall benefits consistent with the priorities established by law, the availability of water supply and the provision of equitable service to authorized functions," and that "[a]s water resource development progresses, or as a result of changing national or regional goals and policies, service requirements for the mainstem system and its components will change" (quoting DX428 and DX6003 ¶ 9-4).

130. The Corps also described how the river would "always be in a dynamic state, continuously changing its various characteristics" because its "alluvial nature" and the "influence[] [of] uncontrolled tributary inflows" meant that "the erosion and deposition process

will continue to occur." Tr. 1521:13–1522:3 (Shumate) (quoting 1981 Potomology Investigation, DX420 at USACE4196620).

131. Dr. Kelman explained that "throughout the late 19th and 20th centuries, the United States Army Corps of Engineers, the Corps, was charged with managing the Missouri and trying to balance competing claims that residents of the basin made on the river. The Corps has, responding to pressures from different groups of basin residents and elected officials, changed its management strategies and its priorities over time." Tr. 1252:2-11 (Kelman); Tr. 1292:4-8 (Kelman).

132. Dr. Kelman explained "Landowners who live and work throughout the basin have typically understood that the Corps must balance competing interests. As a consequence, they have lobbied the Corps to have their wishes enacted in public policy. In short, the management of the Missouri has always been politicized and culturally contingent, always been subject to the vagaries of people's understanding of the natural world around them and also infighting in Washington, D.C. and throughout the basin states. Proprietors have often participated in these processes and should, therefore, be expected to have understood the attenuated nature of the Corps' power, and also the way that the agency's priorities and goals have evolved across the decades." Tr. 1252:12-1253:3 (Kelman); Tr. 1292:9-24 (Kelman).

C. Between 1967 and 2004, the Public Was Well-Aware of Flooding from Omaha to St. Joseph

133. Major floods were experienced in 1973, 1975, 1978, 1984, 1986, 1993, and 1996. Ph. I Tr. 7401:13–7413:16 (Farhat); Ph. I Tr. 8628:11-15 (Shumate) (describing four flood events that were larger than others in 1973, 1978, 1984, and 1993). And additional flooding was documented in this reach in 1967, 1969, 1970, 1971, 1973, 1974, 1982, 1983, 1987, 1991, 1995, 1997, 1999, and 2001. Tr. 1372:22–1388:17 (Remus).

134. Indeed, there was flooding downstream of the reservoir system in 1967, the very first year that the system was completely filled and considered operational, affecting over "500,000 acres of agricultural land." Tr. 1373:1-4 (Remus) (quoting DX 5054-0027).

135. After flooding in 1969, the Corps reported that "large system releases, combined with rainfall runoff below the system resulted in some waterlogging of agricultural areas in the lower basin due to inefficient draining," and observed that "[t]his type of problem can be anticipated in the future when the evacuation of a large amount of accumulated storage is necessary," Tr. 1374:24–1375:7 (Remus) (quoting DX5057-0032).

136. After flooding in 1970, the Corps reported that a "large amount of tributary runoff, coinciding with moderate releases which had previously been made from the mainstem system" led to "inundation of low cropland lying adjacent to the land not protected by agricultural levees, and that 'nearly all' the flooding 'was on land reclaimed from the floodway since the mainstem operations began in 1954.'" Tr. 1375:14–25 (Remus) (quoting DX5058-0037)).

137. After flooding in 1983, when flooding impacted farmers both in May and in late July, the Corps reported that "[d]ue to the timing and long duration of flood stages, many of the farmers along the Missouri River from near Plattsmouth, Nebraska to St. Joseph, Missouri, were unable to replant their low lying fields." Tr. 1382:1-19 (Remus) (quoting DX5046-0063).

138. After flooding in 1995, the Corps observed that "[m]any crops were not planted because of the extremely wet spring and the drainage problems associated with the high Missouri River stage during the planting season"; as a result, "[l]ater in the season as the mainstem reservoir system releases were significantly increased to evacuate storage accumulated during the major flood event, the fact that some acres were not planted resulted in fewer crop inundation problems

during the late summer and fall evacuation period" than would otherwise have occurred. Tr. 1385:19–1389:5 (Remus) (quoting DX5033-0102).

139. After flooding in 1997, the Corps reported that "[s]ignificant flood events have occurred in the Missouri River basin in four of the last -- of the past five years," and that "[t]he most significant damage" in 1997 "may have been to cropland that was not planted again in 1997 because of the lack of field drainage and high groundwater resulting from high river stages," (Remus 1386:18–1387:1 (quoting DX5090-0108)).

140. After flooding in 2001, the Corps reported that while the reservoirs prevent enormous damages, they cannot eliminate flooding as approximately 21,500 acres had still been affected between Gavins Point and St. Joseph, Missouri, which was "much higher than 357 acres affected in 2000 but much less than the 69,500 acres in 1999. Tr. 1388-1-11 (Remus) (quoting DX5085-0032).

D. Past Experience with High Water Events Made Obvious the Potential for Periods of High Water Like the Period from 2004–2018

141. An analysis of modeled water surface elevations at the representative properties shows that high water events of similar frequency, duration, and magnitude, as measured at elevations at the properties that correlate with potential flooding, occurred at the representative properties between 1967 and 2004. Tr. 1994:20–1995:3 (Jones).

142. Water surface elevations at the properties were modeled by Dr. Robert Holmes of the USGS. Dr. Holmes used a linear interpolation method to model daily water surface elevations at specified river miles where the representative properties are located. Tr. 1592:17–1593:2. (Holmes). Dr. Holmes's methodology was similar to the methodology used by Dr. Christensen in Phase I to model "actual" WSEs at the properties, and produced similar results for the period from 1990–2015. Tr. 1688:6–1690:18 (Holmes) (discussing DX6062, DX6063, and DX6064).

143. A key driver in Dr. Holmes's modeling is the measured WSE (or stage) at the stage/discharge gages upstream and downstream from the representative properties. Tr. 1664:10–1665:20 (Holmes) (citing DX7004-0050). Dr. Holmes testified that the streamgages act as integrators of the reach-length effects of changes that have occurred throughout the reach from Omaha to St. Joseph, including the MRRP projects throughout the reach. *See* Tr. 1627:6–9, 24–1628:14 (Holmes).[6]

144. Dr. Holmes's model also used proration to better relate measured elevations at bounding streamgages to modeled elevations at the properties based on the flow at the downstream streamgage. Tr. 1594:19-24; 1642:18-1643:7 (Holmes). The proration scheme incorporated previously-modeled water surface profiles at the representative property river miles from the Corps' 2003 Flow Frequency Study as well as field-measured flood profiles at the representative property river miles from past flood events. *Id.*

145. To assess the model's performance, Dr. Holmes also independently used the same process to model WSEs at stage-only streamgages between the stage/discharge gages. Tr. 1654:19–1655:4, 1673:8–13 (Holmes) (discussing DX6061). Because recorded WSE data from

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[6] *See also* Tr. 1623:5–7 (Holmes) (rating curve changes over time show that gages are not located at stable locations); Ph. I Tr. 4738:11–15 (Christensen) (stating that gage curve analysis showed that "WSEs at each of the USGS gages on the river have increased since 2004, for all moderate and high flow levels"); Ph. I Tr. 5198:21–5199:20 (Hromadka) (testifying that "[w]hat we saw was not only are the rating curves changing, but they changed a lot after 2004," that "something is physically changing" to cause those changes, that "we can see from the bathymetry data it's rising the bottom," and that "sediment falling on the bottom as you would -- I expected, means the water surface rises, bad thing"); *Ideker Farms v. United States*, 136 Fed. Cl. 654, 696 (2018), *reconsideration denied*, 142 Fed. Cl. 222 (2019) (summarizing Dr. Christenen's gage curve analysis and his conclusion that "particularly at high flows, the actual water levels are substantially higher [post-2004] that pre-2004 water levels at the gages" (quoting Ph. I Tr. 4720:23–4721:4 (Christensen) (alteration in original))); Tr. 3060:9–15 (Mays) (agreeing that "there are enough MRRP projects on the Missouri River that the upstream effects of one project may not fully dissipate before running into another water surface elevation increase from a different localized river change").

the stage-only gages was available, Dr. Holmes could compare the model's estimates to recorded data at those locations. Tr. 1654:19–1655:4 (Holmes). Recorded data at the stage-only gages, however, was not available for the entire 78-year period that Dr. Holmes modeled at the representative properties. *See* Tr. 1675:1–4 (Holmes) (DX6065, Plattsmouth, 1977–2018); Tr. 1679:9–17 (Holmes) (DX6067, Brownville, 1972–2018); Tr. 1684:9–14 (Holmes) (DX6070, Oregon, 2009–2011). The average difference between modeled WSEs and recorded WSEs at the stage-only gages ranged from zero feet at Plattsmouth to 0.9 feet at Brownville. Tr. 1676:7–12, 1679:17–21, 1684:15–18 (Holmes).

146. Criticisms of Dr. Holmes's modeling as a tool for use in this phase of the case are unpersuasive. Fundamentally, Dr. Holmes's modeling extends a method of modeling that the Court accepted in Phase I to a longer time frame. *See Ideker Farms*, 136 Fed. Cl. at 697 (rejecting critiques of Dr. Christensen's prorated interpolation modeling); Tr. 1592:17–1593:2 (Holmes) ("I built an interpolation model similar to Dr. Christensen's but not exactly like Dr. Christensen's to provide a consistent methodology for estimates for that entire time period."). The combined use of actual stage data at the gages, where rating curves have changed since 2004, and proration based on earlier modeling and historic water surface profiles, appropriately accounts for the effects of the MRRP through the reaches that include the Phase II representative properties. *See* Tr. 1936:9–1938:3, 1939:7–1949:21 (Jones) (explaining the reasonableness of Dr. Holmes's approach for purposes of evaluating expectations). Notably, Mr. Adkins and Mr. Schneider both testified in deposition that the relationship between stage at a nearby stage-discharge gage and the initiation of flooding at their properties has not changed over time. 01/28/2020 Dep. Tr. 176:14–177:18, 179:9–13, 181:2–11 (Adkins); 01/27/2020 Dep. Tr. 109:22–110:4, 122:13–24 (Buffalo Hollow). This further indicates that the use of interpolation

based gage readings to estimate WSEs at the properties over time is reasonable, as it indicates that the WSE relationship between gage and property has remained stable over time.

147. A site-specific analysis of the modeled WSEs was then performed by Jonathan Jones of Wright Water Engineers, Inc. Mr. Jones's data analysis involved comparing the Holmes modeled WSEs against key elevations from the properties, including drain outlet, top of bank, farmed land on the river side of the levee, farmed land on the land side of the levee, and the top of the levee. Tr. 1843:22–1845:4 (Jones) (discussing DX6050). The elevations were translated (i.e., moved upstream or downstream using a slope of one foot per mile) from the river mile where that key elevation is found at the property to the river mile used in Dr. Holmes's modeling. *See* Tr. 1844:24–1845:4 (Jones). Mr. Jones's analysis focused on the portion of the year from March 15 to November 15. Tr. 1851:9–20 (Jones).

148. At each property, and for each threshold elevation, Mr. Jones's analysis began by counting the number of days in each year from 1950 to 2018 that the elevation was exceeded in the period from March 15 to November 15. Tr. 1849:23–1850:5, 1852:5–9 (Jones) (Adkins property); Tr. 1863:20–1864:12 (Jones) (Ideker Farms property); Tr. 1866:24–1867:16 (Buffalo Hollow property).

149. Mr. Jones's first comparison concerned frequency. By examining rolling fifteen-year periods, he determined that clusters of high-water events occurred during fifteen-year periods prior to 2004 at each property, and that the fifteen-year period from 1983 to 1997 was the most comparable pre-2004 fifteen-year period in terms of the frequency of high water events. Tr. 1872:10–25. Mr. Jones presented graphical representations of this analysis for each threshold elevation at each property. *See* Tr. 1854:21–1857:23, 1865:3–1866:8, 1867:19–1868:22 (Jones) (citing exhibits) Mr. Jones's conclusions regarding prior fifteen-year periods were summarized in

three tables, one for each property.[7] *See* Tr. 1857:25–1858:5 (Jones) (discussing DX6051 (Adkins property)); Tr. 1866:11–23 (Jones) (discussing DX6052 (Ideker Farms property)); Tr. 1868:23–1869:5 (Jones) (discussing DX6053 (Buffalo Hollow property)).

150. Mr. Jones's second comparison concerned magnitude and duration. In terms of quantitative analysis, Mr. Jones performed two initial analyses: first, he ranked the years from 1967 to 2018 by days of exceedance of each threshold elevation; and second, he calculated the percentage of days that each elevation was exceeded in three periods: 1967–2018, 1983–1997, and 2004–2018.[8] Tr. 1910:4–13 (Jones). In a qualitative analysis, Mr. Jones also compared stage-hydrographs generated using the WSE estimates from Dr. Holmes for pre- and post-2004 high water years at the properties. Tr. 1910:14–19 (Jones).

151. In comparing the ranked years, Mr. Jones concluded that as between the period from 2004 to 2018 and the period from 1983 to 1997, neither period consistently included higher duration events than the other. Tr. 1911:12–15, 1914:12–17, 1918:5–1919:9 (Jones). In other words, once ranked, "years from 2004 to 2018 and 1983 to 1997 [we]re interspersed." *E.g.*, Tr. 1911:13–15 (Jones).

152. In comparing the percentages of days that the threshold elevations were exceeded in each period, Mr. Jones concluded that there was no dominant pattern: at each property, some elevations were exceeded a greater percentage of days in the period from 1983–1997, while other

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[7] For each threshold elevation, Mr. Jones's analysis had two permutations: first, counting the number of years in each rolling fifteen-year that each elevation was exceeded on at least one day between March 15 and November 15; and second, counting the number of years in each fifteen-year rolling period that each elevation was exceeded on at least seven out of twelve consecutive days between March 15 and November 15. *See, e.g.*, DX6051.

[8] As with the frequency analysis, this quantitative analysis was performed on the data from March 15 to November 15 for each year. *See* Tr. 1920:16–20 (Jones).

elevations were exceeded a greater percentage of days in the period from 2004–2018.[9] *See* Tr.1919:13–1923:10 (Jones) (discussing DX6019 (Adkins), DX4434 (Ideker Farms), DX4448 (Buffalo Hollow)).

153. In connection with the qualitative analysis of annual stage hydrographs, Mr. Jones testified that the stage hydrograph at the Ideker property in 2010 was roughly comparable (in terms of peak stage and duration) to the stage hydrograph at that property in 1993; that the stage hydrograph at the Adkins property in 2008 was roughly comparable to stage hydrographs in 1984, 1995, and 1996, with stages dropping more quickly in 2008 than in those years; and that the stage hydrograph for Buffalo Hollow in 2013 was roughly comparable with stage hydrographs in 1986, 1987, and 1996, with sharp rises and falls. Tr. 1924:18–1927:4 (Jones) (discussing DX4459, DX4451, DX4471).

154. In sum, Mr. Jones's analysis of magnitude and duration based on the modeled WSEs showed that the period from 1983–1997 "saw high-water events of comparable magnitude and durations to the high-water events that occurred from 2014 to [2018]" at each representative property's threshold elevations, and that "[n]o overarching trend [was] identified at any of the representative properties for critical elevations that show one period to have consistently higher duration events than the other." Tr. 1927:14–22 (Jones).

155. For each part of the data analysis—frequency, magnitude, and duration—Mr. Jones performed a sensitivity analysis by varying parameters. *See* Tr. 1873:9–1874:1 (Jones) (frequency). The sensitivity analysis for frequency involved running the analysis using rolling ten-year periods rather than rolling fifteen-year periods. Tr. 1873:9–1874:1 (Jones). Similarly,

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[9] In his testimony, Mr. Jones noted that the cumulative percentages he calculated for the 2004–2018 period included the days that the threshold elevations were exceeded in 2011. *See* Tr. 1920:24–1921:6 (Jones).

for magnitude and duration, Mr. Jones repeated the percentage of days with exceedance calculations using ten-year periods rather than fifteen-year periods. Tr. 1928:24–13. For magnitude and duration, Mr. Jones also moved the threshold elevations up and down by one foot to see if his findings would change. Tr. 1928:8:21 (Jones). Mr. Jones testified that these sensitivity analyses were performed "because, of course, we know there's uncertainty associated with the estimates that we're talking about here and evaluating." Tr. 1873:13–16 (Jones).

156. Performing the analyses with varied parameters did not yield different results in terms of identifying comparable prior periods with high-water events at the representative properties. Tr. 1873:23–1874:1, 1982:12–21, 1929:5–13 (Jones).

157. Additional criticisms of Dr. Holmes's modeling (and, by extension, Mr. Jones's comparisons of past high-water events to post-MRRP high-water events) are also unpersuasive in connection with the Phase II issues.

158. Mr. Jones's comparisons were performed to evaluate reasonable expectations for the use of the representative properties. A primary criticism of Dr. Holmes's modeling is that his proration scheme at the representative properties uses flow profiles developed for the 2003 Flow Frequency Study, which in turn used channel bathymetry data from the late 1990s for modeling the river's WSEs at different flows.[10] *See* Tr. 2989:13–2990:1, 2992:12–2993:12 (Mays). Dr. Mays claims this make Dr. Holmes's modeling "hardwired" to find similarity in periods with

[10] Plaintiffs will also likely argue that the Corps has produced more up-to-date flow profiles than those found in the 2003 Flow Frequency Study. The study that Plaintiffs have identified, however, did not produce *as an output* profiles like those generated in the 2003 Flow Frequency Study. Rather, it used measured profile data from 2011 and 2012 *as an input* for modeling alternatives under consideration in connection with the MRRMP-EIS process. *See* PX3716 at USACE2571076, USACE2571078. Thus, Dr. Holmes did not have available an updated set of modeled profiles at a range of different flows, as Plaintiffs' critique implies.

comparable flows. *See* Tr. 3006:13–19 (Mays). This assertion, however, ignores the fact that (as discussed above) changes in WSEs at comparable flows would also occur at the gages, such that Dr. Holmes's modeling reflects those changes.[11] *See Ideker Farms*, 136 Fed. Cl. at 703 (crediting Dr. Hromadka's Phase I testimony that "his conclusions regarding sedimentation effects have been confirmed by the USGS rating curves [at the gages] examined by Dr. Christensen, which show not only that WSEs are increasing, but also that WSEs have increased at a greater rate for high flows more recently, meaning that the same high flows are now resulting in higher WSEs than before 2004").

159. Even if this criticism of Dr. Holmes's use of proration had merit, however, it would apply only to the period after 2004. Thus, there is no reason to question Dr. Holmes's modeling for the pre-MRRP period in the 1980s and 1990s that Mr. Jones found comparable. And expectations for the experience of high-water events at the properties reasonably should incorporate the periods of threshold elevation exceedance shown in Mr. Jones's analysis for those decades. *See* Tr. 1930:1–14 (Jones) (Dr. Holmes's pre-2004 modeling consistent with representative Plaintiffs' testimony regarding prior flooding).

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[11] Plaintiffs will also likely argue that the gages do not reflect local changes in WSEs at the representative properties that their expert, Dr. Larry Mays, hypothesized are occurring. *See, e.g.*, Tr. 3037:3–8 (Mays). Dr. Mays, however, performed no analysis whatsoever to determine whether such effects are occurring or how large they might be. *See* Tr. 3083:1–22 (Mays). In his testimony, Dr. Mays also highlighted MRRP projects that are miles away from the representative properties, both upstream and downstream, implying that those projects are affecting WSEs at the properties despite how far away they are. *See* Tr. 842:21–843:6 (Mays) (noting chute projects four miles upstream and ten miles downstream of the Ideker Farms property). Dr. Mays's hypothetical modeling of backwater effects also treats the river as though there were only a single project in a single location causing a single increase in WSE, which is not a reasonable assumption. These unsubstantiated assumptions about localized increases are contrary to the Plaintiffs' own Phase I arguments and the Court's Phase I opinion. *See Ideker Farms*, 136 Fed. Cl. 704–05.

160. Plaintiffs also will likely argue that isolated points of over- and under-prediction by Dr. Holmes's model render his results unreliable. As Dr. Holmes explained, however, Plaintiffs base this criticism on a small subset of the post-2004 data at the relevant flows. *See* Tr. 1694:9–1695:15 (Holmes). Mr. Jones also acknowledged that there would be uncertainties in Dr. Holmes's modeling data (as there would be in any modeling data), and he performed sensitivity analyses due to the existence of those uncertainties. *See* Tr. 1873:13–16 (Jones).

161. Wet stress resulting from high water table conditions routinely depressed crop yields both before and after the MRRP was implemented. Tr. 2521:23-2422:1 (Evans). There is clear evidence that the Plaintiffs experienced recurring overbank flooding outside the levees prior to MRRP. Tr. 2522:2-5 (Evans). Plaintiffs experienced seepage and block drainage landward of their levees during multiple years between 1990 and 2003, even excluding the 1993 flood year. Tr. 2522:6-9 (Evans). All representative properties experienced yield depression resulting from wet conditions in more than half of the years from 1990-2003. Tr. 2522:19-22 (Evans).

162. The Ideker representative property flooded frequently prior to the MRRP. In the 14 year period from 1990 -2003, the Ideker property reported "total crop failure, that is zero yield" for corn in four years with irrigation and three years without irrigation. Tr. 2510: 18-25 (Evans); DX4818 (Ideker RMA data). Total crop failure for soybeans was reported for two years. *Id.* These yield shortfalls are inherent to the Ideker property and would be expected to impact yields in perpetuity. Tr. 2511:12-19 (Evans). Ponding riverward of the levee on the Ideker representative property occurred every year from 1990 to 1998. Tr. 2511:21-2512:3 (Evans); DX4647-36 (Ideker ponding maps - 1990-1998). "Ponding occurred over most of the property in four of the eight years . . . with moderate ponding inside the levee also in 1998." Tr. 2512:13-17; DX4647-36 (Ideker ponding maps - 1990-1998). Ponding exceeded 12 inches in portions of the

representative property landward of the levee in 1995, 1996, and 1997. Tr. 2512:18-21 (Evans); DX4647-36 (Ideker ponding maps - 1990-1998). "Ponding in excess of three feet deep occurred riverward of the levee on the Ideker representative property in 1999, 2001 and 2004, with ponding occurring over most of the property in 1999. Tr. 2513:210 (Evans); DX4647-37 (Ideker ponding maps 1999-2004). Ponding on the Ideker representative property in 1995 and 1997 was deeper than ponding on the representative property in 2010, the wettest claim year. Tr. 2514:23-25 (Evans); DX7007-209 (Ideker Ponding Maps).

163. The Adkins representative property flooded frequently prior to the MRRP. Ponding in excess of three feet deep occurred outside the levee in four of the eight years from 1990-1997. Tr. 2516:4-7 (Evans); DX4647-47 (Adkins ponding maps–1990-1997). Crop damaging ponding occurred in four of the eight years" from 1990-1997. *Id.* From 1998-2003, the representative property experienced ponding in 1998, 1999, and 2001. Tr. 2517:3-15 (Evans); DX4647-48 (Adkins Ponding maps 1998-2003). The inherent wet conditions that prevailed on the Adkins representative property before MRRP would be expected to depress yield on Adkins property after MRRP. Tr. 2515:24-2516:2 (Evans).

164. The Buffalo Hollow representative property flooded frequently prior to the MRRP. From 1990-1997, ponding in excess of three feet deep riverward of the levee occurred in six of the eight years. Tr. 2520:11-16 (Evans); DX4647:58 (Buffalo Hollow ponding maps 1990-1997). Crop damaging ponding landward of the levee occurred in at least three of the eight years. *Id.* Ponding in excess of three feet occurred in 1998 and 1999 riverward of the levee. Tr. 2520:12-15 (Evans); DX4647-59 (Buffalo Hollow ponding maps 1998-2003. The inherent wet conditions that prevailed on the Buffalo Hollow representative property before MRRP would be expected to depress yield on property after MRRP. Tr. 2519:3-9 (Evans).

E. Other Public Information Available as of 2004 Also Described Continuing Flood Risks

165. Mr. Jones also testified about additional considerations relevant to expectations based on public information available as of 2004, including published flow frequency data, flood insurance mapping, and other public documents describing flood risks.

166. Mr. Jones's analysis of published flow frequency data showed that at the gages the representative Plaintiffs themselves use for reference, the frequency of flows that correspond to stages where flooding initiates at the properties have remained relatively constant over time, such that an expectation for the chance of experiencing flows that reach that stage would be generally consistent. Tr. 1955:9–24 (Jones) (discussing DX6055, DX6066, DX6067 (tables)). This analysis involved using the rating curves at the gages that were current at the time that flow frequency information was published (i.e., the 2004 rating curve for 2004 flow frequency information, or the 1962 rating curve for 1962 flow frequency information) to find the flow at the gage at that point in time that would result in the threshold stage at the gage being reached. *See* Tr. 1946:20–1947:23 (Jones) (discussing DX6049).

167. Mr. Jones also reviewed public documents issued by the Corps and other entities before 2004 concerning flood risk along the Missouri River. Tr. 1960:4–9 (Jones). And he reviewed current and former FEMA flood insurance studies and rate maps for the reaches of river that include the representative properties. Tr. 1972:14–1977:21.

168. Mr. Jones testified that his review shows that pre-2004 public documents discussed five major themes related to flood risk: (1) that flooding occurred along the river before 2004 and that the Pick-Sloan Plan does not mitigate all flood risk or control inflows below the dams; (2) that development of the floodplain reduces its ability to store water and leaves lower-lying areas especially vulnerable; (3) that future flooding will occur and flood risk expectations should

consider the Missouri River's dynamic nature; (4) that significant opportunities for public involvement and information have been provided; and (5) that as of 2004, it was expected that climatological factors may exacerbate flood risk. Tr. 1960:4–1961:2.

169. Of particular note, in connection with expecting future flooding, Mr. Jones highlighted how the Corps stated in 1995 that "[f]loods greater than the 1993 flood catastrophe will happen in the future"; that "[i]t would be prudent to prepare for future floods larger than the 1993 event"; and that "[w]hen we are properly prepared for catastrophic flood events, small floods will be more easily accommodated." *See* Tr. 1964:4–9 (quoting DX4846-0016 (1995 Floodplain Management Assessment)). Mr. Jones also testified that the 1994 Interagency Floodplain Management Review Committee report (known as the "Galloway Report") stated that "[r]ainfall and floods like the 1993 event will continue to occur"; that "[f]loods are natural repetitive phenomena"; that "[c]onsidering the nation's short history of hydrologic record-keeping as well as the limited knowledge of long-term weather patterns, flood recurrence intervals are difficult to predict" and that "[a]ctivities in the floodplain, even with levee protection, continue to remain at risk." Tr. 1965:8–15 (Jones) (quoting DX4828 at USACE5869225). The Galloway Report was listed in a 1997 Newsletter sent to Buffalo Hollow Farms to announce the initiation of a multi-year Flow Frequency Study. Tr. 172:12-175:12 (Schneider); DX5312. The Newsletter is one of several that Buffalo Hollow received; the Newsletters described a public involvement process as part of the study and open houses the Corps planned to hold after the study was released. Tr. 174:5-14; 175:13-176:23 DX5314. Buffalo Hollow's owners did not bother to read the 2003 Flow Frequency Study, the Galloway Report, or the Floodplain Management Assessment of the Upper Mississippi and Lower Missouri Rivers from 1995. Tr. 174:15-175:12 (Schneider).

170. Mr. Jones also described how a 2000 Corps Flood Hydroclimatology Report stated that "[a]nalysis of unimpaired flow data constructed by the U.S. Army Corps of Engineers found statistically significant upward trends in many gage records along the Upper Mississippi and Missouri Rivers." Tr. 1967:11–15 (Jones) (quoting DX4850-0015).

171. As to flood insurance rate maps and studies, Mr. Jones testified that part or all of the three representative properties have been identified since the 1970s or 1980s as within the 100-year floodplain or floodway. Tr. 1973:1–4, 14–16, 1974:24–1975:4 (Jones). Mr. Jones explained that the floodway is "the core of the floodplain." Tr. 1973:19–20 (Jones).

172. Mr. Jones also explained that flood insurance studies (which include water surface profile information) "typically accompany flood insurance rate maps" and "provide valuable background information." Tr. 1975:11–14 (Jones). For each property, Mr. Jones plotted the locations of the threshold elevations on the flood insurance study profiles. *See* Tr. 1975:21–1977:21 (discussing DX4484 (Adkins), DX4485 (Ideker Farms), DX4486 (Buffalo Hollow)). For all the properties, the elevations of drain outlet, top of bank, and minimum farmed land level inside and outside the levees plotted below or near the ten-year flood level (i.e., the level that has a 10% chance of exceedance in any given year).[12] *See id.*

173. Based on the analysis described above, Mr. Jones concluded that the high flood risk posed by the river to people living and farming in the floodplain was "readily apparent" as of 2004. Tr. 1978:21–25 (Jones).

[12] Because the chance of experiencing high flows accumulates, the probability of experiencing a 10% exceedance flow at least once within a ten-year period is approximately 65%.

174. Following flooding events in 1973 and 1984, the Corps warned of some floodway encroachments along the Missouri River and the corresponding increase in flooding risk. Ph. I Tr. 8628:22–8629:8 (Shumate).

175. In a 1981 Missouri River Flood Plain Study and Levee Inventory, the Corps stated that private levees had a major impact on reducing the overall floodway capacity. In this report the Corps also stated that this situation was most serious in the middle and lower portions of the study area, where over 600 miles of private levees had been constructed between Rulo, Nebraska and the mouth of the River. Ph. I Tr. 8659:4-17 (Shumate).

F. Site-Specific Drainage Analysis Reveals a Propensity for Blocked Drainage at Each Property

176. Mr. Jones also conducted a site-specific analysis of the properties, which showed that the conditions correlated with the potential for blocked drainage regularly occur. Tr. 1979:4–7, 1991:15,–1992:21 (Jones); *see also* Tr. 147:5–6 (Schneider) (blocked drainage experienced before 2007).

177. Mr. Jones explained that generally blocked drainage flooding may occur when rainfall causes enough runoff to fill the onsite drainage ditches and the river WSE meets or exceeds the elevation where water begins to spill out of the ditches onto farmland, which Mr. Jones called the "breakover" elevation. Tr. 1983:2–25 (Jones); *see also* Tr. 1980:11–17 (Jones) (defining the breakover concept).

178. Mr. Jones used topographic data to calculate the runoff volume needed to fill the onsite drainage ditches, and then used the NRCS curve method to determine the amount of rainfall required to generate that amount of runoff. Tr. 1981:22–1982:16 (Jones). He also analyzed the modeled WSEs from Dr. Holmes to see how often the breakover elevation was reached in the periods from 1983–1997 and 2004–2018, and analyzed precipitation data to determine how

frequently enough rainfall events that would fill the ditches if the drain was blocked could be expected. Tr. 1981:17–21, 1982:17–24 (Jones).

179. Mr. Jones's analysis showed two things. First, the breakover elevation was reached a relatively similar number of times during the 1983–1997 and 2004–2018 periods. Tr. 1986:9–15 (Jones). Second, assuming the drains were blocked, the site-specific rainfall amount required to generate enough runoff fill the ditches would be expected to occur more frequently than once per year at each property. Tr. 1988:10–22, 1989:11–16, 1989:25,–1990:3 (Jones).

180. Based on this analysis, Mr. Jones concluded that based on their experiences prior to 2004, the representative Plaintiffs should have expected interior drainage flooding to continue to occur. Tr. 1992:7–10 (Jones).[13]

G. The Comprehensive Pick-Sloan Plan Was Never Fully Constructed as Envisioned, thus Nullifying Any Expectations Arising from Publicity After its Passage and Initial Project Construction

181. The levee system contemplated in the Pick-Sloan plan was never fully constructed. Tr. 1515:9–10 (Shumate). And even as contemplated, the plan did not intend to fully levee all Missouri River floodplains. Tr. 1515:10–12 (Shumate). There are 91,600 acres landward of federal levees between Rulo, Nebraska and Kansas City, Missouri, which represents 67 percent of what was originally envisioned to be protected under the Pick-Sloan Plan. Ph. I Tr. 8606:10-17 (Shumate). Neither the Ideker nor the Buffalo Hollow properties are in locations that were to

[13] Mr. Jones also noted Mr. Schneider's testimony at trial that the timing of blocked interior drainage flooding can be an important factor in whether that flooding causes damage to crops. *See* Tr. 1990:21–1991:6 (Jones) (discussing Tr. 202 (Schneider)). But for assessing expectations, what matters more whether the chance of interior drainage flooding has changed, regardless of timing, as expectations founded in probabilities should not change even if predictable events did not always come to fruition in the past.

be totally behind Federal levees according to the (uncompleted) Pick-Sloan plan. Tr. 1516:20–24 (Shumate).

H. The Evidence Does Not Support a Finding of a Changed Flood Pattern Due To the MRRP

1. As it Has in the Past, the Missouri Basin, Including the Reach from Omaha to St. Joseph, Experienced a Wet Period from 2007 to 2018

182. As noted above, the Missouri River experiences wet and dry cycles that are apparent in hindsight, but not predictable in foresight. *See*, *e.g.*, Sections VI.A, VI.C, VII.D.

183. After a period of drought from 2000 to 2006, a wet cycle began, with the years 2007, 2008, 2010, 2011, 2013, and 2014 all featuring high to extreme regional precipitation. *See* Tr. Op at 28–33 & nn. 17–22; Ph. I Tr. 13500:12 - 13501:12 (Hudson) (2008, 2009, 2011, 2012, 2013, and 2014 were all considered wet years with a lot of precipitation); Ph. I Tr. 13502:19–13504:1 (Hudson) (statewide streamflow treads for 2007–2014 were higher than normal).

184. The wet cycle continued from 2015 to 2018, with high runoff and the reservoirs at or above the base of the annual flood control zone at the start of each runoff season. *See supra* § III; *cf.* Ph. I Tr. 7097:19-7098:5 (Farhat) (explaining how droughts "build upon one another" such that the reservoirs may not "refill" to the base of the annual flood control zone at the start of the next runoff year).

2. Dr. Mays's Opinions Regarding Changed Flooding Patterns and Hydrologic Flood Risk Are Not Reliable

185. Plaintiffs, through Dr. Mays, asserted that the flooding patterns around Plaintiffs' properties have been permanently changed. *See* Tr. 849:17–21, 850:16–22, 8996–16 (Mays). However, for several reasons, Dr. Mays' opinions are not reliable and do not fit with the underlying evidence.

186. In generating his opinions, Dr. Mays failed to make any kind of apples-to-apples comparison of the pre- and post-MRRP experiences at the properties. Put another way, for the post-MRRP years, Dr. Mays did not properly compare the actual and but-for conditions at the properties. Because his comparisons are flawed, his conclusions about flooding patterns and hydrologic risk are not valid.

a) Problems With Dr. Mays's Quantitative Analysis of Gage Heights and Peak Discharges

187. Dr. Mays purported to "analyze whether the hydrologic evidence reflects that the post-2000 (sic) flooding pattern has continued and whether the post-2014 flooding is consistent with the changed pattern." Tr. 837:211–24 (Mays). Implicit in this formulation is the idea that the MRRP caused a "pattern" of flooding. Yet in reality, what the Court found in Phase I was that in some years, at some properties, the "cumulative and combined" effects of the Corps' System and River Changes caused increased WSEs at the properties that led to flooding, or more severe flooding, than would otherwise have been experienced in those years. *See Ideker Farms*, 136 Fed. Cl. at 674, 720 n.73; *see also id.* at 692 (flooding in 2011 could not be considered with other flood years because the 2011 releases "were not part of the 'single purpose' to comply with the ESA).

188. Thus, to properly evaluate any "consistency" with the incremental flooding caused by the Corps' actions from 2007 through 2014, Dr. Mays would have to have evaluated for 2015–2018 the same factors that experts evaluated in Phase I—i.e., how (if at all) would releases have differed pre-MRRP *based on changes made for ESA compliance*, and how (if at all) would WSEs have differed at the properties during the period when the representative Plaintiffs claimed to have experienced flooding. *See Ideker Farms*, 136 Fed. Cl. at 730 (denying Adkins claim for 2013 because expert analysis showed flooding only early in the season "and not later in the

summer, as plaintiffs claim"; and denying Adkins claim for 2014 because Plaintiffs "failed to how any difference in WSEs in 2014 between the "but-for" and actual worlds").

189. Further, to meaningfully quantify how the changes under the MRRP affected an inherent flood risk at the properties, it would be necessary to quantify flood risk both before the MRRP began and after the MRRP was in effect.

190. Dr. Mays, however, did not analyze the effects of System Changes on flows for any year from 2015 through 2018. Tr. 937:1–938:4 (Mays).

191. Instead, Dr. Mays purported to analyze "peak discharges and gage heights associated with flooding years" before and after the MRRP. Tr. 849:24–850:1 (Mays).

192. Dr. Mays admitted that his approach had significant limitations. *See* Tr. 851:4–11 (Mays) (testifying that his method "does not provide a perfect measure of flooding at each bellwether property during the time frame discussed because it only considers peak discharges and gage heights, only examines discharges measured at gages, and does not measure the depth or duration of flooding").

193. And these acknowledged limitations were fatally compounded by an element of subjectivity about what constitutes "flooding" for purposes of the analysis, which renders the entire exercise useless. Thus, Dr. Mays used a chart for each property to identify years between 1980 and 2018 when (according to him) there was flooding at the representative properties. *See* Tr. 852:13–864:17 (Mays) (citing PX3415, PX3413, and PX3419). The charts included the year, the peak discharge at the nearby gage in that water year, and columns for "flooding" and "MRRP flooding." *See* PX3415, PX3413, PX3419. Dr. Mas concluded from these tables that, post-MRRP, "the properties started flooding . . . at gage peak flows at lower levels where [they] had not historically flooded." Tr. 859:9–11 (Mays).

194. To determine when the properties flooded pre-MRRP, however, Dr. Mays relied entirely on conversations with the representative Plaintiffs, and did not read their sworn testimony from depositions in 2020, in which Mr. Adkins and Mr. Schneider testified to flooding in years that did not appear on Dr. Mays's charts.[14] *See* Tr. 919:21–25, 920:13–16 (Mays); *compare* PX3419 (Adkins chart showing no flooding in 1995 and 1997), *with* 01/28/2020 Adkins Tr. 200:10-201:17, *and* PX3413 (Schneider chart showing no flooding in 1995, 1997, or 1999), *with* 01/27/2020 Tr. 124:25-125:5, 241:16-242:3, 243:1-6 (Buffalo Hollow). Further, the Plaintiffs' crop insurance and crop yield records from the 1990s indicate they had reduced yields in years that do not appear on Dr. Mays's charts, which Dr. Evans opined were likely caused by wet stress. *See supra* ¶¶ § VI.E (crop insurance claims); ¶¶ § VII.D (yield analysis by Dr. Evans).

195. It therefore appears that Dr. Mays either (1) did not know about flooding that occurred in certain years pre-MRRP, or (2) subjectively excluded that flooding from his analysis as not "substantial," while keeping in all post-MRRP flooding, even post-MRRP flooding that had small impact on yields. *See* Tr. 841:20–23 (Mays) (stating that for purposes of his analysis, "a flooding year is a year in which a bellwether Plaintiff reported substantial flooding"); Tr. 650:22–25 (Bateman) (no impact to Ideker corn yields in 2013 or 2014).[15]

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[14] Dr. Mays did note at trial that Mr. Adkins testified to flooding in 1995, a year in which flooding was not indicated on Dr. Mays's chart, but Dr. Mays waved that off as just "a little caveat." *See* Tr. 861:24–862:3. But 1995 at the Omaha gage had a similar peak flow to 2008 and a lower peak flow than 2007, 2014, 2010, and 2018. *See* PX3419. By Dr. Mays's own logic, then flooding in those post-MRRP years would not evidence a changed flooding pattern. That there was "flooding" but not "MRRP-flooding" in 2013 and 2014 at the Adkins property similarly undermines Dr. Mays's conclusions.

[15] At trial, Dr. Mays acknowledged that in his expert report, he did not draw a distinction between "substantial" and non-substantial flooding at the representative properties when tabulating the years in which the properties did not flood pre-MRRP. *See* Tr. 914:8–916:18 (Mays).

196. Also, as noted above, Dr. Mays assumed that flooding from 2015–2018 was caused by the MRRP without performing a but-for analysis. Even if this method were otherwise sound, he therefore cannot know whether experiences in those years had a connection to the MRRP or not.

197. As a corollary to the analysis of peak discharges, Dr. Mays also performed what he termed "simply an arithmetic representation of the flooding and causation" for the post-2007. Tr. 855:20–856:22, 860:2–861:3, 863:18-864:17 (Mays). He did this by dividing the number of years with what he calls "MRRP flooding" by the number of year with either "MRRP flooding" or no flooding – that is, he did not include 2011 in the denominator of his fractions. *See id.*

198. There are two problems with drawing conclusions about changes in flooding patterns from these calculations. First, half the calculations include the years from 2015 through 2018, for which causation has not been proven. *See id.* Second, and equally important, it is well-known that the Missouri basin oscillates between periods of wet cycles and dry cycles. Tr. 2258:5–8 (Earles); *see also* Tr. 6869:1–19 (Farhat). And as Dr. Earles, the United States' rebuttal expert, explained, the sample sizes Dr. Mays used *for these calculations* are too small to avoid the possible selection bias created by these oscillations. *See* Tr. 2258:5–20. Thus, Dr. Earles demonstrated that had similar calculations been performed on modeled WSEs during a previous wet cycle between 1988 and 1998, a prediction that WSEs would continue to reach those levels with similar frequency in the future would have been wrong, since a several-year dry period began in 2000. *See id.* at 2259:24–2260:11 (Earles).

b) Problems with Dr. Mays's Analysis of Inherent Hydrologic Risk

199. Dr. Mays also performed what he termed an analysis of inherent hydrologic risk at the representative properties. There are three problems with his analysis. First, the basic input for this analysis—an annual exceedance probability ("AEP") for a given flow—was improperly

computed. Second, the analysis is entirely insensitive to duration or severity, making it extremely imprecise. Third, and perhaps most important, Dr. Mays performed no *comparison* of how (if at all) inherent hydrologic risk may have changed pre- and post-MRRP. The calculation is therefore of little worth to the Court.

200. In terms of Dr. Mays's inputs: Dr. Mays used a program called PEAKFQ to determine an AEP for the smallest peak discharge at each property that he associated with post-MRRP flooding. Tr. 943:24–244:5 (Mays). He testified that he used PEAKFQ differently than what it is normally used for. Tr. 944:6–10 (Mays). For the Adkins property, the year he used was 2017, a year for which causation has not been proven. *See* Tr. 874:20–25 (Mays).

201. Dr. Mays fed into the PEAKFQ program peak flow data from the relevant gages that he downloaded from the USGS website. Tr. 944:11–945:25 (Mays). The peak flow data spanned the years from 1970 to 2019, which post-date the closing of the mainstem dams. *See id.*; *see also* Tr. 881:1–10 (Mays) ("What I'm doing is I'm taking a sample of data out here which reflects the operation of that system, and the system changes over that time period from 1970 to 2019. I specifically want that data that has all of these, if you will, watershed changes, due to the reservoirs. It has the MRRP changes effectively in it -- okay? -- at the gaging station . . . .").

202. The PEAKFQ program calculates flow frequency curves. Tr. 946:1–3. Flow frequency curve relate flows to AEPs for a large range of discharges, meaning that a curve can readily be used to determine the flow associated with a particular AEP or the AEP associated with a particular flow. *See* Tr. 2182:19–2183:15 (Earles). And it follows that an unreliable curve will yield unreliable AEPs for specified flows, and vice-versa. *See* Tr. 2183:16–19 (Earles).

203. The mathematics and statistics applied by PEAKFQ to create flow frequency curves follow statistical methods given in a USGS publication known as Bulletin 17C.[16] *See* Tr. 2187:3–8, 2190:5–11, 2193:9–16 (Earles); *see also* DX4263-0039 to -0047. And those statistical methods, in turn, are predicated on the use of homogeneous peak flow data, meaning peak flow data where "there have not been changes over time that would affect the population of the data." Tr. 2187:3–8 (Earles). But Bulletin 17C specifically and repeatedly states that unadjusted regulated peak flow data is *not* homogenous peak flow data for the purposes of performing an analysis that follows Bulletin 17C.[17] *See* Tr. 949:14–953:19 (Mays).

204. As Dr. Earles explained, the proper procedure for computing flow frequency curves for the Missouri River is complicated and involves many steps. Tr. 2218:18–2221:7 (Earles) (discussing DX5083 and DX1026). This is due not only to the extensive regulation by the mainstem dams, but also to the mixed distribution of flood peaks (i.e., spring and summer floods caused by different mechanisms) and the possibility that floods in successive years are not the product of independent events given the basin's "hydrologic memory" (i.e., moisture conditions that can carry over from one year to another). Tr. 2196:21–2198:4 (Earles).

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[16] Dr. Mays included in his report a quotation from Bulletin 17C stating that Federal agencies and State, local, and private organizations are encouraged to use the Bulletin's guidelines to assure uniformity in flood frequency estimates. *See* Tr. 948:14–949:5 (Mays).

[17] Plaintiffs will likely argue that Bulletin 17C's statistical methods may appropriately be applied to regulated data notwithstanding the document's clear statements to the contrary, and may point to a 2012 re-study of flow frequency conducted by the Corps. *See* DX1026. In that study, however, the Corps first performed the Bulletin 17 analysis after making the kinds of adjustments to the data contemplated by Bulletin 17. *See* DX1026-0022 to -0029. Then, after cautioning that "Bulletin 17B analysis is not typically performed on regulated data sets," the Corps performed such an analysis "for comparison purposes." *Id.* at DX1026-0030. Thus, unlike Dr. Mays, the Corps did not perform a Bulletin 17 analysis on regulated data for the purpose of developing exact values.

205. Dr. Mays's flow frequency curves were further tainted by the use of skew coefficients that give a poor representation of the distribution of the peak flow data at the gaging stations because they combined (or "weighted") regulated skew values and unregulated skew values.[18] Tr. 2215:24–2217:21 (Earles).

206. A comparison of Dr. Mays's flow frequency results for the years from 1980–2019 at the three gages (Omaha, Rulo, and St. Joseph) with the results of the Corps' 2003 Flow Frequency Study (which followed the proper procedure) shows that twenty-seven percent of the recurrence intervals do not agree. Tr. 2221:19–25 (Earles). Further, where there are differences, Dr. Mays's results generally indicated a more frequent recurrence interval for a given flow than the Corps' results—a result favorable to the Plaintiffs because it tends to indicate that higher flows should be expected to occur more frequently.[19] Tr. 2222:1–5 (Earles); *see also* Tr. 2233:17–2237:4 (Earles) (specifically comparing recurrence intervals from the 2003 Flow Frequency Study with Dr. Mays's recurrence intervals for post-MRRP peak flows).

207. Beyond simply conveying a general impression that flows associated with post-MRRP flooding are more likely to occur than is indicated by the Corps' 2003 Flow Frequency Study, Dr. Mays also plugged the AEPs derived from his flow frequency curves into his inherent

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[18] The recommended approach for a large watershed like the Missouri River is to develop a study-specific regional skew coefficient, which Dr. Mays did not do. *See* Tr. 2213:4–20 (Earles).

[19] Plaintiffs are also likely to argue that the differences between Dr. Mays's results and the Corps' results are due to his inclusion of peak flow data in years in the period from 1997 through 2019. There are two problems with this argument. First, the Corps' analysis went much farther back in time that Dr. Mays's analysis, and thus drew on a much longer aggregate period of record. *See* DX1026-0007 to -0008 (period of record for 2003 study was from 1898 through 1997). Second, the Corps re-evaluated its analysis in 2012 and added in the years from 1997 through 2011, and found that the curves either did not change (Omaha, Rulo) or that there may have been a modest change at the upper end of the curve (St. Joseph). *See* Tr. 2227:19–2228:25 (Earles).

hydrologic risk analysis. Tr. 965:12–16 (Mays). In this analysis, he used only the AEP for the lowest post-2007 flow he associated with flooding at a representative property. Tr. 967:19–22 (Mays). Had he instead used the AEPs for the same flows from the Corps' 2003 study, his risk analysis would have returned lower probabilities of experiencing those flows. Tr. 2245:8–2247:24 (Earles).[20]

208. In addition, Dr. Mays did *not* identify the minimum flow levels associated with flooding at the properties *pre*-MRRP or calculate the inherent hydrologic risk that existed at the properties pre-MRRP. He therefore did not quantify whether or how inherent hydrologic risk at the properties may have changed as a result of the MRRP.[21] Or, put another way, Dr. Mays presented no "but-for" values for inherent hydrologic risk.[22] Absent a but-for hydrologic risk, no quantitative comparison can be performed.

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[20] Dr. Earles observed that because the equation used to calculate inherent hydrologic risk is an exponential equation, "any errors in the recurrence interval estimates are magnified." Tr. 2243:16.

[21] Dr. Mays also did not present any results that would indicate that flow frequencies have changed due to the System Changes component of the MRRP. Rather, as described above, he contends that flooding has occurred at the properties post-MRRP at flows and/or stages the gages that were not correlated to flooding at the properties pre-MRRP. In other words, he contends that the frequency of experiencing flooding has changed due to the MRRP, but he does not present an analysis of the chance of experiencing a flow of a given magnitude has (or has not) changed due to the MRRP.

[22] Dr. Mays did testify about a "purely hypothetical" qualitative method that he believed could be useful in comparing hydrologic risk pre- and post-MRRP if implemented. *See* Tr. 892:12–18, 894:2–896:23 (discussing the "generic risk matrix" concept). He admitted, however, that he had "not applied this" concept to the facts of the case, and that "if [he] would have applied it, [he would] give this to the bellwether and let them figure out where they live on there." Tr. 895:16–18. As such, Dr. Mays's hypothetical exercise in qualitatively comparing hydrologic risk has no evidentiary value.

3. Further Shallow Water Habitat Construction That Might Affect this Reach is Not Expected

209. As discussed above, the 2018 BiOp does not mandate further shallow water habitat construction, and the planned IRC construction will take place well downstream of the three representative properties. *See supra* Section IV.

210. Sediment generated by MRRP projects is mobile and moves through the reaches of the river. *See* Ph. I Tr. 5152:18–5153:9, 8562:19–8563:1 (Hromadka) (explaining the dynamics of sediment transport associated with introducing new sediment).

I. Intermittent Flooding Does Not Significantly Interfere with the Ability to Farm Plaintiffs' Properties

211. Extensive evidence confirms that Plaintiffs' ability to farm their flood-prone land has not been significantly affected by the United States' activities along the river. While Plaintiffs' properties remain subject to flooding (as they always have been), Plaintiffs still have productive farms. Plaintiffs are earning substantial profits. Plaintiffs' property values still remain at near-record highs. Each Phase II Representative is still eligible for crop insurance, even on the sections of the representative property that have been designated high-risk by the RMA. Tr. 2672: 7-14 (Zanoni).

212. Plaintiffs are aware that the Corps has been making T&E releases since 1989, and continue to make T&E releases under the 2006 Manual. Ph. I Tr. 4918:13–4919:14 (Christensen).

1. Adkins

213. According to the Adkins Partnership's Schedule F tax documents, they make significant profits off of crop yield sales and have made a profit in each year from 2003 to 2018. Tr. 122:17-22 (Adkins Partnership); *see also* DX4045-DX4059 (IRS Schedule F tax documents).

214. The portion of the Adkins & Sons representative property that is designated as high-risk by the RMA has not changed after the implementation of the MRRP. *Compare* DX5492 and DX 7008-45 (2006 West Pottawattamie, County high risk map) with DX5482 and DX7008-41 (1989 West Pottawattamie, County high risk map). *See also* Tr. 2672:16-2673:9 and 2673:23-2674:7 (Zanoni – describing the portion of the Adkins representative property riverward of the levee as high-risk in 1989 and 2006); Tr. 2720:3-15 (Zanoni – confirming that the Adkins representative property riverward of the levee is still high risk today). The Adkins & Sons Partnership made seven claims for excess moisture on the representative property in the 12 years between 1992 and 2003, if you count 1998 which could not linked to the representative property with complete certainty because it was missing a Land ID. By contrast, the Partnership made eight claims for excess moisture/flooding on the representative property in the 15 years between 2004 and 2018, if you count 2011 and 2016, which also lacked land IDs. Tr. 2682:18-2683:4 (Zanoni); DX 4564 (cause of loss key); DX4181 (Adkins PHI report 1992-1999); and DX4664 (Adkins PHI report 2000-2018).

215. Mr. Adkins acquired the land with the expectation to continue farming it and with the hope to make a profit, the Partnership's Schedule F documents indicate that the Partnership makes significant profits of off crop yield sales each year and they have made an overall profit from 2003 to 2018. 01/28/2020 Dep. Tr. 43:8-16, 45:17-20 (Adkins Partnership); *see also* Tr. 122:17-22 (Adkins Partnership); DX4045-DX4059 (IRS Schedule F tax documents).

2. Buffalo Hollow

216. The portion of the Buffalo Hollow Farms Inc. representative property that is designated as high-risk by the RMA has not changed after the implementation of the MRRP. *Compare* DX5484 and DX7008-58 (Doniphan County High Risk Map 2004) with DX5483 and DX7008-52 (Doniphan County high risk map 2000). *See also* Tr. 2675:5-16 and 2676:2-10 (Zanoni –

describing the portion of the Buffalo Hollow representative property below the bluff as high-risk in 2000 and 2004); Tr. 2721:14-2722:4 (Zanoni –confirming that the bottomland of the Buffalo Hollow Farms Inc. representative property is still rated AAA, high risk).

217. Buffalo Hollow continues to farm all of the previously flooded property. 01/27/2020 Dep. Tr. 271:6-9 (Buffalo Hollow).

3. Ideker Farms

218. Roger Ideker admits that he has not heard of any decreased property values near the representative property. Tr. 271:18-21; 271:25-272:5 (Ideker Farms).

219. Ideker Farms, Inc. leased the majority of the representative property to the Tubbs, a prominent farming family, who farms thousands of acres of land in Missouri and is familiar with the land because prior to leasing, they farmed a tract of land near the representative property that flooded after 2004. Tr. 294:24-295:4 (Ideker Farms); *see also* 01/29/2020 Dep. Tr. 30:9-31:9; 31:24-32:19; 40:3-5 (Ideker Farms). The Tubbs family originally leased the property in 2017 for a two-year term at $260 per acre. 01/29/2020 Dep. Tr. 28:10-14 (Ideker Farms). Mr. Ideker considers $260 to be a fair price per acre. *Id.* at 39:1-5. Mr. Ideker stated that "any prudent farmer would base the price on fertility," along with other factors such as location and the need to farm more acres. *Id.* at 34:13-15. The lease includes the ability to grant a flowage easement across the property without compensation or damages to the tenant. Tr. 295:16-296:1 (Ideker Farms). The Tubbs family did not ask for a lower price despite the inclusion of the flowage easement provision in the lease. *Id.* at 297:14-15 (Ideker Farms). The Tubbs have renewed their lease for another two-year term at the same price. 01/29/2020 Dep. Tr. 38:3-17 (Ideker Farms). The Tubbs pay a high rental value that reflects their knowledge of the flooding and fertility of the land, despite the possibility that the land may be encumbered by a flowage easement.

220. The portion of the Ideker Farms Inc. representative property that is designated as high-risk by the RMA has not changed after the implementation of the MRRP. *Compare* DX5495 and DX7008-52 (Holt County high risk map 2007) with DX5486 and DX7008-49 (Holt County high risk map 1995). *See also* Tr. 2676:11-21 and 2677:5-14 (Zanoni – describing the portion of the Ideker representative property riverward of the levee as high-risk in 1995 and 2007); Tr. 2720:20-25 (Zanoni – confirming that the area riverward of the levee on the Ideker Farms Inc. representative property is designated as high risk). Any flooding on the Ideker Farms Inc. representative property in 2013 and 2014 was not severe enough to warrant a crop insurance claim to be filed. Tr. 2685:19-24 (Zanoni); DX4564 (cause of loss key); DX4819 at 58-64 and 127-132 (Ideker PHI report 2000-2018).

221. Ideker testified that the river house on the property repeatedly flooded from 2007 to 2011, when it was destroyed and rebuilt in 2012 above the FEMA-specific floodplain level. Tr. 219:15-25 (Ideker Farms). However, Mr. Ideker did not think it was important to investigate what the FEMA flood zones were at the representative property because "whatever it is, it's not going to change the farming activity." 01/29/2020 Dep. Tr. 91:20-92:11 (Ideker Farms).

222. Ideker testified that the property experienced "significant" flooding in 1984 and 1993. Tr. 272:22-24 (Ideker). He then stated that flooding was not significant in terms of destruction of property for 2013, 2014, and 2015, but only in terms of blocked drainage and seepage, which also occurred in 1984 and 1993. Tr. 273:7-274:4 (Ideker Farms); *see also supra* Part VI, Section E.3, discussion on seepage on the southern fifty-five acres.

VIII. Date of Taking: Extensive Evidence Shows that Plaintiff Knew or Should Have Recognized the Atypical Flooding as Early as 2007

A. By 2004, There Was Significant Public Awareness of the Corps' Plans to Make Changes to its Operations and that Alternatives Under Consideration Could Affect Flooding in the Reach from Omaha to St. Joseph

223. The inception of the MRRP followed a multi-year public process that involved significant public input. *See Ideker Farms*, 136 Fed. Cl. at 666–67 (discussing negotiations with the U.S. Fish & Wildlife Service ("FWS") through the 1990s and early 2000s and related multi-district litigation); *id.* at 675–76 (discussing, among other documents, the 2002 National Research Council Report (PX16) and the 2003 Mitigation Project Final Environmental Impact Statement (PX99)); Ph. I Tr. 5997:21–6000:22 (Tofani) (discussing a 1999 USGS study that looked at the potential impact of river operational changes on groundwater levels and "predicted negative impacts (higher groundwater levels) during the spring and summer months as a result of the Fish and Wildlife Benefits Plans"). The public input included expressions of concern over possible flooding impacts of some of the alternatives under consideration. *See* Ph. I Tr. 499:21-500:18 (Ponganis); Ph. I Tr. 3191:20-3192:7 (Olson).

B. The Plaintiffs' Phase I Testimony and the Court's Phase I Findings Described the Corps' Initial Actions under the MRRP in 2004 as Dramatic

224. In the Phase I Opinion, the Court noted that the Corps embarked on an accelerated program of constructing shallow water habitat ("SWH") in 2004. *See* 136 Fed. Cl. at 668 (describing the Corps' SWH construction activities in 2004 as "unprecedented"); *id.* at 694 ("[B]etween March and June of 2004, the Corps made 427 traditional dike notches, 119 type B dike notches, 91 revetment notches78 chevron type major dike modifications, 75 bank notches, seven pilot channels, four dredging projects and three chute restorations for the purpose of creating SWH. (quotation omitted)); *id.* at 702 (noting Dr. Hromadka's testimony that "he focused his attention on the River Changes after 2004 because in 2004 the Corps accelerated its

SWH creation activities"); *id.* at 703 (noting Dr. Hromadka's testimony that "in a seven-week period in 2004, the Corps dredged more than 450,000 cubic yards of sediment during two SWH projects, which the Corps then deposited into the River").

225. Dr. Hromadka's, Plaintiffs' Phase I expert, repeatedly stated that the "significant acceleration" in the Corps' dike notching program in 2004 "changed the river." Ph. I. Tr. 5123:16-19; 5131:5-9; 5165:17-20; 5142:3-4; 5186:11-15; 5198:22; 5200:1-3; 5234:15-16; 5235:16-18; 5239:11-12; 5273:17-18; 5484:9-10; 5485: 24-25; 5488:4-6; 5514:12-18; 5524:1-12 (Hromadka). Dr. Hromadka similarly testified that "2004 is important in understanding why the river is convulsing" because "[i]t has all these changes going on." Ph. I Tr. 5131:5–5132:5 (Hromadka).

226. The Corps' SWH construction projects, beginning in 2004 and continuing through 2007 and beyond, were readily observable. And Plaintiffs knew about the habitat projects on the river prior to 2010. 01/27/2020 Dep. Tr. 84:16-85:3, 85:9-24 (Buffalo Hollow); 01/28/2020 Dep. Tr. 155:19-156:6 (Adkins Partnership). Indeed, Mr. Ideker's own firm performed work for the Corps in 2004 that involved placing sediment in the river. Ph. I Tr. 4107:7–9 (Ideker) (testifying that "in 2004, [his company] excavated mitigation sites in Missouri for the Corps"); Ph. I Tr. 5142:3–7 (Hromadka) (testifying that in 2004, Mr. Ideker's firm "dredged more than 450,000 cubic yards of sediment and deposited it into the river").

C. Phase I Testimony Proffered by the Plaintiffs Described the River as Having Reached a Noticeable Tipping Point by 2007

227. In Phase I, Dr. Hromadka testified that following the events of 2004, "[b]y 2007, when the next high-water event presented itself in the river, flooding resulted and then has continued and will continue." Ph. I Tr. 5123:20–22 (Hromodka). He also opined that "[t]he river has been out of equilibrium ever since all these projects started. And the Corps does an excellent job in

what it's trying to do." Ph. I Tr. 5123:23–25 (Hromodka). And he testified that "when the river comes out of its drought stage, such as in the year 2007, we're going to have more sediment than usual in the river and so we get a sediment surge, there's more sediment now moving into the river than normal for the flow that's occurring in the river, and that coincides to when complications started." Ph. I Tr. 8577:2–8 .

228. Dr. Hromadka related what he called numerous "credible eyewitness observations of the Plaintiffs who relate a consistent observation of a changed river since 2006". Ph. I. Tr. 5060:8-10 (Hromadka); *see also* Ph. I Tr. 5075:20-23 (Hromodka) ("Things change hereafter. And when did it change? From here, things changed. Something happened. The things changed after 2006."); Ph. I Tr. 5168:14-21 (Hromadka) ("[W]hen I interviewed these bellwethers, they said, we're having to bring out pumps to get rid of this. And then increased incidents of blocked drainage, drainage systems functioned for years pre-2006 and now bellwethers consistently report that their flap gates are closing at lower river gage readings than pre-2004, as much as four feet.") Ph. I Tr. 5212:5-9 (Hromodka) ("Eyewitnesses report higher incidents of blocked drainage since 2006. Flap gates and screw gate along the lower river with levees blocked more often and for longer duration by high water in the river."); Ph. I Tr. 5491:12-14; 5493:13-16; 5171:12-14 (Hromadka).

229. Dr. Hromadka specifically referenced several Phase I Plaintiffs who described noticing changes at their properties starting after 2006. *See* Ph. I Tr. 5330:13-14 (Hromadka) (Griffin quoted as saying drainage gates are blocked much more frequently since 2006); Ph. I Tr. 5427:1-5 (Hromadka) (Ideker quoted as saying drainage culverts are frequently blocked since 2006); Ph. I Tr. 5459:18-19 (Hromadka) (Rouse quoted as saying he experienced seepage several times since 2006); Ph. I Tr. 5463:19 (Hromadka) (Frakes quoted as having drainage blocked more

frequently and personally witnessing the river rising more quickly, and "that just never happened prior to year 2006").

230. Dr. Hromadka also testified that "if [he] look[ed] at the stage discharge curves, those are those curves at the gages, you see there's been some very significant changes in those curves at the year 2007, because the curves change dramatically and the USGS had to go out there and measure them." Ph. I Tr. 8563:12–17.

231. Kathy Holstine, the former county clerk in Holt County, also testified in Phase I that "[s]tarting in '07, by '07 and '08, we certainly had concerns, and that's me, as well as the county proper, that the chutes were causing some problems in the way that the river flows." Ph. I Tr. 4332:2–5.

232. Dr. Hromadka concluded that the River changed after 2004 and that the flooding in question would not have occurred or would have been significantly less severe in scale and/or duration "but-for" the Corps' System and River Changes. Ph. I Tr. 5234:15-5235:2 (Hromodka); *see also* Trial Op. at 112.

233. For some of his work in Phase I, Mr. Tofani also "assume[d] that 2004 and prior years are representative of the pre-shallow-water habitat conditions, and that the post-2004 years are representative of the river with the shallow-water habitat conditions." Ph. I Tr. 6021:16–19 (Tofani).

D. Many People Living along the River Recognized that Atypical Water Level Increase Began in 2007

234. The river began running high in 2006, it is running slower, rises faster with rainfall events, and it is different than before 2006. Ph. I Tr. 2892:14-15, Tr. 2895:20-23 (Griffin).

E. Plaintiff Adkins Knew about the Atypical Water Level Increases in 2007 and Other Early Years

235. Adkins Partnership admits that atypical flooding began in 2007. Tr. 83:2-4 (Adkins Partnership).

236. The Phase I Trial Opinion held that flooding occurred in April and May of 2007, during the planting season. Trial Op. at 173.

237. The Phase I Trial Opinion held that flooding occurring in June 2008 and was similar in severity, duration, and damage to 2007. *Id.*at 174.

F. Plaintiff Buffalo Hollow Knew about the Atypical Water Level Increases in 2007 and Other Early Years

238. Buffalo Hollow admits that atypical flooding began in 2007 and he has witnessed river changes since 2006. Tr. 145:11-14,152:19-21 (Buffalo Hollow).

239. The Phase I Trial Opinion held that flooding occurred from May 7 to 15, and again from May 24 to 25 in 2007. Trial Op. at 244.

240. The Phase I Trial Opinion held that flooding occurred from May 30 to June 21 in 2008. *Id*.

241. Ron Schneider knew after the MRRP was constructed that the atypical flooding on his property was related to the MRRP because the Corps approached the Schneiders twice back in the 1990's about purchasing their bellwether tract, and this indicated to Mr. Schneider that the "Government viewed our tract as desirable for flooding and widening the river due to the ongoing changes with the MRRP." *Compare* Tr. 151:4-8 (Buffalo Hollow), *with* Tr. 150:5-12 (Buffalo Hollow). The Schneiders then refused to sell their land to the Corps. Tr. 150:17-18 (Buffalo Hollow).

G. Plaintiff Ideker Knew about the Atypical Water Level Increases in 2007 and Other Early Years

242. Ideker Farms admits that atypical flooding began in 2007. Tr. 224:17-20; 228:18-20; 231:9-12 (Ideker Farms). "[B]eyond any doubt the river has changed since 2004-2006. If you live or work along the river as all the Plaintiffs do, you know the river has changed." Ph. I Tr. 4170:14-17 (Ideker).

243. The Phase I Trial Opinion held that flooding occurred for 30 to 60 days beginning in May 2007. Trial Op. at 219.

244. The Phase I Trial Opinion held that flooding began in mid-June of 2008 and lasted 30-45 days. *Id*. at 220.

H. Plaintiffs' Own Experts Support a Taking Date of 2007

245. Plaintiffs' own expert asserted that the changes that led to increased flooding were inherent in the 2004 revised Manual. Ph. I Tr. 4652:4-4653:1, 4660-13:-4661:14 (Christensen).

246. Plaintiffs reported to their expert hydrologist that since 2004, there has been a dramatic increase in flood frequency and in floodwater levels. *Id.* at 4699:5-10 (Christensen). Plaintiffs state cause of flooding "isn't rocket science". Dr. Christensen asserted that if you put structures in the river to get it to stay in one place and be self-scouring, and then start pulling the same structures out, the river is going to start to revert back to what it was. *Id.* at 4673:16-21 (Christensen).

IX. Just Compensation

247. Plaintiffs presented evidence at the Phase II trial that purported to show that flooding patterns in the region have changed permanently as a result of the Corps' activities. As result, Plaintiffs posit a loss in property values as a result of a permanent flowage easement taken by the United States over their properties. However, Plaintiffs' evidence fails in a number of respects.

A. Plaintiffs' Appraiser Opinions Are Not Reliable

1. Leo Smith

248. Mr. Smith is not a member of the Appraisal Institute. Tr. 365:3-5 (Smith). He has not worked on flowage easements before this case and did not know what a flowage easement was before working on this case. Tr. 365:10-16 (Smith).

249. Mr. Smith agrees that the Yellow Book is an authoritative text in the appraisal field and that the purpose of this report was to generate a Yellow Book-compliant opinion of market value. Tr. 365:23-366:5 (Smith). He admits that the Yellow Book calls for appraisers to conduct before-and-after appraisals to inform just compensation determinations. Tr. 372:1-7 (Smith). But Mr. Smith did not perform a before-and-after appraisal in this case. Tr. 374:18-22 (Smith).

250. Mr. Smith's appraisals do not constitute "after" appraisals under the Yellow Book. Tr. 377:14-23 (Smith). Mr. Smith did not offer an opinion on just compensation in this case. Tr. 374:22-24 (Smith).

251. Mr. Smith's appraisals do not differentiate between flooding the Corps made more severe versus flooding that would have occurred in the absence of the Corps' river system changes. Tr. 374:25-375:16 (Smith).

252. Smith agrees that determination of a larger parcel is essential to an appraiser's analysis of highest and best use, but that his larger parcel analysis is not Yellow Book-compliant. Tr. 376:5-16, 377:2-4 (Smith). The Adkins family farms all four sub-tracts that Smith appraises as a single unit. Tr. 419:5-11 (Smith).

253. Mr. Smith's valuation date was based on instruction from counsel and was not independently derived. Tr. 377:5-13; Tr. 378:19-22 (Smith). Mr. Smith did not ask why he was developing an opinion of value effective four years after the last flood on the property that Judge Firestone held the Corps made more severe in Ph. I Tr. 379:4-9 (Smith).

254. Mr. Smith's assessment of the 69-acre parcel lacks a proper factual basis. For the 69-acre parcel, Smith's appraisal constitutes a 630% increase in price over the seven years since the Adkins family purchased this tract. Tr. 379:20-24, 380:12-381:6 (Smith). Smith agrees that a property's highest and best use will ordinarily be its existing use because landowners will normally put their property to its highest and best use. Tr. 382:11-20 (Smith). Smith opines that the 69-acre tract should have a different highest and best use than agricultural use, but he doesn't know what that alternative use would be. Tr. 381:21-24; 385:18-24 (Smith). The 69-acre tract has been used for agricultural purposes since the Adkins bought the tract in 2007 up through the Phase II trial. Tr. 380:9-11 (Smith). Smith acknowledges that development of the 69-acre tract would require physically changing the land, but he doesn't know how much change is required. Tr. 383:18-384:11 (Smith). Smith believes an industrial use for the 69-acre track is unlikely. Tr. 385:25-386:2 (Smith). Mr. Smith did not conduct his own analysis of supply and demand to assess the market for a change in use of the 69-acre tract, but instead relies on the city of Council Bluff's 2030 development plan. But the 2030 development plan is a statement of what the city hopes to become, not on a market-driven change in the reasonably foreseeable future. And the 2030 development plan was created in 2004 and amended in 2014, but no development of the 69-acre tract has occurred during that time. The 2030 development plan calls for a portion of the 69-acre tract to be developed for multi-residential use. Tr. 388:3-390:4; 401:9-13 (Smith). The 69-acre tract has been taxed as agricultural land before and after December 31, 2014, and Smith has not inquired into why an agricultural tax basis remains. Tr. 392:9-19 (Smith).

255. The comparable sales underlying Mr. Smith's appraisal are not reliable. Mr. Smith used the same five comparable sales and the same sales adjustment chart for both of his development appraisals. Tr. 412:21-25; 414:12-20 (Smith). Mr. Smith was directed to his five comparable

sales from John Jerkovich, a local real estate broker who works "a lot" and consults Ken Adkins. Tr. 392:25-395:14 (Smith). Mr. Smith makes no adjustments to the comparable sales for access, frontage, zoning, and location, even though the subject property differs from each of the comps in these areas and each of these areas are important to developers. Tr. 395:15-396:10 (Smith). Mr. Smith only used two of the five comparable sales for determining a value for the 69-acre tract. Tr. 396:11-20 (Smith). Mr. Smith made no adjustments of the two comparable sales he used to value the 69-acre tract even though the subject was three-to-six times larger than the two comparable sales and developers avoid acquiring excess land. Tr. 397:11-24 (Smith). Mr. Smith does not know the flood frequency of the two comparable sales he used to value the 69-acre tract and made no adjustments for flood frequency. Tr. 397:25-398:3 (Smith). One of the two comparable sales Mr. Smith used to value the 69-acre tract was already zoned for commercial use. Tr. 398:4-7 (Smith). The other comparable sale Mr. Smith used to value the 69-acre tract has already been developed with an industrial concrete plant sometime after 2014 and at the time of the sale was already the subject of a zoning change application and a specific development plan. Tr. 398:15-399:15 (Smith). The concrete plant is across the street from a waste transfer station, which is not what a developer would look for in a residential development. Tr. 401:14-22 (Smith).

256. Mr. Smith does not know when the 80-acre tract flooded. Tr. 402:1-16 (Smith). Mr. Smith projects a residential development on the 80-acre tract even thought it has been used for agricultural use. Tr. 403:7-12 (Smith). Mr. Smith opines that a zoning change for the 80-acre tract would be probable even though conversion of the 80-acre tract to residential use contradicts the city of Council Bluffs' 2030 development plan. Tr. 403:13-404:14 (Smith). By selecting a different site to convert to residential, a developer could avoid the added costs of a zoning

change for the 80-acre tract that contradicts the 2030 development plan. Tr. 405:12-406:11 (Smith). Mr. Smith concedes that his projected zoning change for the 80-acre tract is a "guesstimate." Tr. 406:12-15 (Smith). Mr. Smith concluded that residential development of the 80-acre tract was likely because there was a development immediately to the north (Fox Run) that he thought was sold-out. But he was mistaken. It took sixteen years to construct and sell 40 acres of residential development land in Fox Run and new houses remain available. Tr. 406:16-408:1 (Smith). Conversion of the 80-acre tract to residential would require significant fill. Mr. Smith does not know how much fill would be required, what it would cost, or how that amount of fill compares to the preparation costs for competing land. Tr. 410:16-412:3 (Smith). Mr. Smith used only one of the comparable sales to determine a value for the 80-acre tract. The comparable sale has a different proposed use (high density residential) under the 2030 development plan and is closer to shopping and recreation. Tr. 416:14-418:22 (Smith). Mr. Smith concedes that farms can have different compositions of soils and different uses within a larger tract and appraisers can account for those variations while appraising farm units as a whole. Smith acknowledges that farmers would not sell only their levee-protected farmlands and buyers would not buy only unprotected farmland. Tr. 419:15-420:23 (Smith).

257. Mr. Smith makes not adjustments on the farmland parcels for flood frequency. Tr. 421:22-422:3 (Smith).

258. Mr. Smith's adjustments for the 750-acre parcel are inconsistent in that he applies higher per-acre values for the same land to the subject than he applies to the comparable sales. Tr. 426:24-3-428:11 (Smith).

259. For the 750-acre tract, Mr. Smith chose a value $6,700/acre, which is near the top of his highest comparable sale. That comparable sale is a 39-acre farm. Smith concedes that the market

for 39-acre farms is different than the market for 750-acre farms, that size is an appropriate characteristic for adjustment, and that as the size of land increases, unit price decreases. Tr. 429:4-17, 430:5-431:3, 432:19-22 (Smith).

260. Mr. Smith reaches a total value of opinion by adding up the four component parts of his different appraisals even though USPAP states that appraisers must refrain from separately appraising component parts of a property and then simply adding them up. Tr. 433:23-435:17 (Smith).

261. Dr. Babcock provided a spreadsheet for Mr. Smith to populate with sales data. The spreadsheet sought for each information on land use, improvements, and distance from the river. Mr. Smith applied his own subjective judgment as to which transactions were arms-length transactions. Mr. Smith does not consider his collection to be a random sample. Mr. Smith relayed his results to Plaintiffs' counsel, not to Dr, Babcock. Tr. 439:23-442:3 (Smith).

2. Tim Keller

262. Mr. Keller did not differentiate flooding caused by the Corps from flooding caused by other sources, including Mother Nature. Tr. 489:7-11, 490:25-491:8 (Keller). Keller does not opine on the value of the properties based on flooding solely attributable to the Corps. Tr. 491:13-22 (Keller).

263. Mr. Keller agreed that the flooding history does not interfere with the development potential or the agricultural use of the properties. Tr. 492:21-493:2 (Keller).

264. Despite testifying that his appraisal complies with the Yellow Book, Mr. Keller acknowledges that this case presents a partial federal acquisition, that the Yellow Book calls for a before-and-after valuation in partial federal acquisitions, and that he did not perform a before-and-after valuation. Tr. 502:7-508:22, 506:16-507:2 (Keller). Mr. Keller's appraisals do not provide sufficient information for the Court to make a just compensation award in compliance

with the Yellow Book. Tr. 505:23-506:2 (Keller). Appraisers work with third-party experts to develop regression analyses for deriving an opinion of value, but it is the appraiser that is ultimately responsible for forming an opinion of value. Tr. 507:12-25 (Keller).

265. Damages are not separately appraised in federal land acquisitions because the before-and-after method captures compensable damages to the remainder. Severance damages are compensable, but consequential damages are not compensable. Tr. 508:1-509:2 (Keller).

266. Mr. Keller's appraisals do not properly adjust for location or flood frequency. Tr. 527:13-16, 528:4-7 (Keller). Keller concludes that properties without levee protection are more susceptible to frequent flooding. For comparable sales that have 50% of farmland without levee protection, Keller makes a 5% adjustment in price. Keller characterizes this adjustment as not significant. Tr. 528:12-529:7 (Keller).

267. The Ideker Farm is 1,500 acres and the comparable sales range from 118 to 413 acres. Keller ultimately concedes that the buyers for a 1,500-acre farm are not in the same market for smaller farms. Tr. 532:24-533:7, 535:15-20 (Keller).

268. Keller treats the entire Buffalo Hollow farm as a single unit despite physical differences between uplands and bottomlands and a different use (quarry) for the uplands. Tr. 536:10-537:12 (Keller). Keller understood that only the bottomlands of the Buffalo Hollow farm was subject to flooding. Tr. 540:21-24 (Keller). Keller violates USPAP by separately appraising the upland component and bottomland component of the Buffalo Hollow farm and then adding those components without considering the assemblage value. Tr. 542:6-543:3 (Keller).

B. Dr. Babcock's Model of Property Value Losses is Flawed and Untrustworthy

269. Plaintiffs, through Dr. Babcock, asserted that the three Phase II Plaintiffs' land values had been diminished by a permanent flowage easement that the United States allegedly took over

Plaintiffs' lands. However, for several reasons, Dr. Babcock's opinions are not reliable and not supported by the record evidence in this case.

1. Dr. Babcock Admitted on Cross-Examination to Many Flaws in His Work Product

270. This case presented a unique problem and Babcock is not known as a switch point economist, had not previously been asked to solve a problem like the one presented here, and had not performed a difference-in-difference model. Tr. 1079:2-9, 1080:21-1081:1, 1082:8-23, 1084:2-10 (Babcock).

271. Dr. Babcock is not an appraiser, has not worked on takings cases before, has not worked with flowage easements before, and is not familiar with the definition of just compensation. Tr. 1086:7-1087:7 (Babcock).

272. Dr. Babcock performed his work without reference to USPAP or the Yellow Book and did not have the definition of fair market value from the Yellow Book in mind when preparing his report. Tr. 1088:1-12 (Babcock).

273. Dr. Babcock was assigned his December 31, 2014, valuation date from counsel and does not know why that date was chosen. Tr. 1088:23-1089:15 (Babcock).

274. Dr. Babcock plotted the Nishnabotna farmland sales against the Iowa statewide farmland to show a positive correlation between the two datasets, but Babcock did not compare farmland sales prior to his switch point for the Missouri River farmland properties against the Iowa statewide dataset. Tr. 1093:15-1094:14 (Babcock).

275. The Babcock model addresses economic effect, not causation. Tr. 1099:2-22 (Babcock).

276. Dr. Babcock interprets his switch point results as providing an average effect on *all* Missouri River bottomland, even though the sales he considers are limited to Iowa and his soil quality is based on an Iowa-only index (CSR-2). Tr. 1143:8-1144:9 (Babcock). At bottom, Dr.

Babcock's regression of 145 sales in Iowa along the Missouri River is being used to purportedly extrapolate a result that he opines can be applied to *all* of the Missouri River bottomlands, including the bellwether properties in Kansas and Missouri. Tr. 1144:24-1145:21 (Babcock). Babcock assumes that changes in farmland in Iowa reflects changes in farmland across the rest of the Missouri River Basin. Tr. 1148:21-1149:1 (Babcock).

277. Dr. Babcock's Missouri River switch point analysis tells him that there was a negative shift in prices on January 1, 2011, and that this price difference is due to something other than CSR, tillable acreage, and average Iowa statewide land prices. Tr. 1168:5-18 (Babcock). Dr. Babcock concludes that the MRRP is the cause of this price differential, but it is based on a chain of inferences: (1) change in land prices due to a difference in crop productivity, (2) change in crop productivity due to a change in crop production, (3) change in crop production due to a difference in flood risk, (4) a difference in flood risk due to difference in the frequency of flooding, and (5) a difference in the duration and frequency of flooding due to the MRRP. Tr. 1172:19-1174:2, 1175:17-1176:12 (discussing DX7021) (Babcock). But for each of these five inferences, there is an alternative explanation for the cause-and-effect relationship that Babcock does not account for. Tr. 1177:10-1178:15, 1180:5-24 (Babcock).

278. The implication of the Babcock model is that the entire change in property values took place on January 1, 2011, and this implication is factually incorrect. Tr. 1106:19-1107:11 (Babcock).

279. Dr. Babcock selected his January 1, 2011, switch date for three reasons: enough time had passed since 2004 for the market to become aware of the effects of the MRRP, the 2011 flood, and Babcock's conversations with the bellwether landowners. Tr. 1107:12-1108:4. (Babcock). But Dr. Babcock admits that the changes from the MRRP manifested themselves by 2007, not

2011. Tr. 1110:6-16 (Babcock). And the 2011 flooding would have occurred *after* January 1, 2011, and, in any event, was *not* caused by the MRRP. Tr. 1113:5-1114:10 (Babcock). And the bellwether landowners told Dr. Babcock that they became aware of the MRRP's changes to the river sometime between 2007 and 2009, not January 1, 2011. Tr. 1115:22-1116:22 (Babcock).

280. In selecting the January 1, 2011, switch date, Dr. Babcock did not interview landowners other than the three bellwether owners, did not conduct empirical analysis, did not interview buys or sellers in the Nishnabotna or Missouri River basins, and did not review publicly available information about flooding patterns. Tr. 1117:7-1118:17 (Babcock).

281. Dr. Babcock considered no alternative approaches to selecting his January 1, 2011, threshold date. Tr. 1108:12-1109:10 (Babcock).

282. In contrasting the Nishnabotna River basin with the Missouri River basin, Dr. Babcock concluded that the one factor that is different between the basins is that the MRRP changed flooding patterns of the Missouri but not the Nishnabotna. Tr. 1119:17-1120:15 (Babcock). But Dr. Babcock was unfamiliar with the relative sourcing, length, and basin size of the two river systems. Tr. 1120:18-1122:16 (Babcock). And Babcock agrees that the flood risk or flooding patterns on a piece of property depends on a host of factors. Tr. 1127:25-1128:15 (Babcock). Dr. Babcock did not compare the hydrology of the Nishnabotna system to the Missouri River system. Tr. 1133:9-13 (Babcock). And Dr. Babcock is not familiar with the relative degrees of channelization of the two rivers, nor does he know what years the Nishnabotna River flooded. Tr. 1135:4-11 (Babcock).

283. The sales data Dr. Babcock received from Smith did not provide information on location. Tr. 1137:24-1138:2 (Babcock).

284. Dr. Babcock uses Sunding's location data to plot the location of all but about 29 of the Smith sales, but Babcock's switch point model uses all data points, including those as to which Babcock does *not* know the location. Tr. 1140:3-1142:2 (Babcock).

285. By removing three datapoints, Dr. Babcock's point estimate increased from 25.7% to 26.9%, a 5% increase. Tr. 1141:24-1142:2 (Babcock).

286. The sales data Dr. Babcock obtained from Smith included information on distance to the river and presence of improvements, but Babcock did not use this information to control his switch point analysis. Tr. 1142:12-1143:7 (Babcock).

287. Although Dr. Babcock agrees that hail, drought, input prices, and pestilence can affect yields, his switch point model does not account for these variables. Tr. 1149:12-1151:13 (Babcock). Location (*i.e.*, distance to urban centers or distance to the river), improvements, and farm size also affect land values, but Babcock does not account for these variables in his regression analysis. Tr. 1151:14-1153:22 (Babcock).

288. Dr. Babcock does not construct the confidence intervals for his estimated price coefficients. Tr. 1154:11-17 (Babcock).

289. There is a statistically significant negative coefficient for prices after January 1, 2011, in the Missouri River basin (*i.e.*, both ends of the confidence interval are negative), while there is no statistically significant negative or positive coefficient for land prices after January 1, 2011, in the Nishnabotna River basin (*i.e.*, the confidence interval straddles zero). Tr. 1159:22-1160:5 (Babcock).

290. Dr. Babcock's graphing of his regression results are misleading because he does not show the error bars, which would show that the Nishnabotna, like the Missouri, may have had a negative change in prices after January 1, 2011. Tr. 1162:21-1163:17, 1164:7-19 (Babcock).

291. Dr. Babcock does not know whether any elements of the MRRP are currently affecting crop production. Tr. 1181:13-1182:1 (Babcock).

292. The Babcock switch point analysis does not account for the duration of flooding, the severity of flooding, or the presence of levees. Tr. 1182:17-1183:2 (Babcock).

293. Dr. Babcock does not dispute Sunding's construction of confidence intervals for the original Babcock switch point analysis. Tr. 1185:12-23 (Babcock).

294. The prices in PX 3390, 3391, and 3392 are projections, not actual sales prices. Tr. 1185:24-1189:4 (Babcock).

295. Dr. Babcock's switch point regression result is an average effect, it is not focused on any one individual property. Tr. 1196:13-18 (Babcock).

296. Dr. Babcock's application of his average price figure from his switch point analysis to the three bellwether properties is "difficult" because there is no straightforward transition to get from average effect to specific effect. Tr. 1192:17-1193:2 (Babcock).

297. Dr. Babcock agrees that the correct way of determining the impact of flooding is a before-and-after valuation, but he does not know how such a before-and-after valuation might be performed. Tr. 1195:18-1196:12 (Babcock).

298. Dr. Babcock makes subjective upward adjustments to each of the three bellwether properties based on what he felt were higher-than-average flood effects each property experienced. Tr. 1199:5-14 (Babcock). But Babcock looking to flooding occurring after 2014 (*i.e.,* for floods as to which the Court has not determined MRRP liability). Tr. 1199:15-1200:12 (Babcock).

299. Dr. Babcock incorrectly states that the MRRP caused five years of flooding on the Adkins farm in Phase I. Tr. 1200:20-1201:8 (Babcock).

300. Dr. Babcock incorrectly calculates his denominator for determining the frequency of Phase I flooding on all three farms. Tr. 1201:9-1203:5 (Babcock).

301. Dr. Babcock takes his January 1, 2011, price differential and applies it to a December 31, 2014, land value obtained from Smith and Keller. Tr. 1205:6-24 (Babcock).

2. Dr. Sunding Revealed Further Flaws in Dr. Babcock's Model

302. Dr. Sunding identified several specific reasons why Dr. Babcock's analysis of Plaintiffs' property values is flawed and inaccurate.

303. First, Dr. Sunding showed that Dr. Babcock's data set of property sales from just four counties in Iowa is inadequate to support Dr. Babcock's model of estimated property values in the Missouri Basin. Tr. 2742:22-2743:21 (Sunding). Specifically, Dr. Sunding showed that Dr. Babcock's model is based on only approximately eleven sales transactions per year on average: "Parcels that are sold on the market are a sample of the underlying population of all farm parcels. Because farmland tends to sell infrequently, the sample parcels within a given time period window is often only a small subset of the true underlying population of farm properties." Tr. 2752:6-12 (Sunding). *See also* Tr. 2751:18-2752:20; 2754:10-2755:1 (Sunding). In some years, Dr. Babcock's results are drawn from as few as one or two sales: "That's an extraordinarily small dataset to try to do what he's doing which is come up with an inferred land prices for a very large stretch of the Missouri River." Tr. 2810:24-2811:2; 2810:1-2811:15 (Sunding) (discussion of Dr. Babcock's inadequate dataset); PX3355 (list of Dr. Babcock's transactions per year, showing that in 16 of the 22 years of data (73%), at least part of Dr. Babcock's analysis was based on four or fewer transactions). Dr. Babcock's small sample sizes render his model unreliable: "because he bases his estimates on a small number of transactions, his results are, to use econometric terminology, imprecise, which is another way of saying is that they have very large[] error bounds." Tr. 2754:22-2755:1 (Sunding). Moreover, Dr. Sunding showed that unlike

trustworthy econometric models, Dr. Babcock's dataset was not selected in a reliable or random fashion, but instead reflected a preselected set of property transactions by Plaintiffs' appraisers: "So in econometrics, this phenomenon is what we call selection bias." Tr. 2755:16-17 (Sunding). *See* generally Tr. 2755:6-2756:3; 2752:20-2754:9 (Sunding). Indeed, despite extensive investigation, Dr. Sunding was unable to find any public record verifying even the existence of 18 of Dr. Babcock's transactions (i.e., a full *8%* of the observations in Dr. Babcock's model cannot be verified). Tr. 2757:5-16 (Sunding).

304. Second, Dr. Sunding showed that in constructing his model, Dr. Babcock did not even use a proper "difference-in-difference" framework that is commonly used by econometricians for this sort of work: "Dr. Babcock uses a nonstandard statistical framework and misinterprets his results." Tr. 2759: 4-6 (Sunding). "[E]conomists have an accepted framework for how to use treatment and control groups to identify the causal effects of intervention. However, Dr. Babcock does not apply the accepted economic framework for doing so, which leads him to misinterpret his findings in ways that I believe are important." Tr. 2760:2-9 (Sunding). Dr. Sunding explained in detail how a true difference-in-difference model works, and how Dr. Babcock's model offered only the first part of the analysis (i.e., a first different model) Tr. 2759:3-2777:19.

305. Third, Dr. Sunding showed that instead of using a standard econometric approach to determining a trigger date for his model, Dr. Babcock inappropriately used a "data mining" technique to pick his 2011 trigger date: "So rather than tying the specification of his econometric model to publicly available information or documentary evidence, Dr. Babcock instead chose his treatment date based on an exercise in what I can only call data mining, he let the data tell him which date to choose when selecting his econometric model, so it's backwards in my view. And he ran his model based on several alternative choices of treatment date and he chose the one that

resulted in the largest diminution in property value." Tr. 2798:21:2799:6 (Sunding). The trigger date is crucially important, because it is supposed to reflect (according to Dr. Babcock's model) when people purportedly had recognized that farmland in the Missouri River bottomlands should sell at a discounted price as a result of river flooding. Econometricians constructing a model will use specific techniques to investigate and identify a trigger date:

> So what an economist would do when specifying an econometric model like this is you look at what information was actually available to buyers and sellers of land at different points in time. Because, after all, we're trying to understand how changes in the market price of land move around. And things can only move around if people know -- know something is going on. So one way of doing this -- in fact, actually, a technique that I've used, is to use articles appearing in the local media. You can do a LexisNexis search, for example, for articles appearing in local print media and search for certain terms like MRRP or flooding or Corps of Engineers to see what information was available to market participants at different points in time. And again, my testimony is that's a common technique. More frequently now, economists use things like Google searches to figure out what information market participants had in mind at different points in time.

Tr. 2797:12-2798:10 (Sunding). But Dr. Babcock did not do any of this. Tr. 2798:11-2799:6 (Sunding). Dr. Sunding explained in detail the impact of Dr. Babcock's inappropriate selection of a 2011 trigger date, and how that crucial mistake infected Dr. Babcock's entire model. Tr. 2799:7-2802:6 (Sunding). Dr. Sunding further explained that because Dr. Babcock's dataset has so few observations, his model will simply fail to show any statistically significant results for most trigger dates. Tr. 2802:2-2811:21 (Sunding). Indeed, even in the 2011 year that Dr. Babcock chose as his trigger date, his model reflects only five transactions in the Missouri River bottomlands, and only four transactions in the Nishnabotna bottomlands. Tr. 2810:18-2811:21 (Sunding). "Well, no wonder Dr. Babcock's results are highly random and fail this robustness check . . . . I conclude that Dr. Babcock's statistical results are very fragile, and it's no surprise when his model is based on such a small number of transactions . . . ." Tr. 2811:12-19 (Sunding).

306. Fourth, Dr. Sunding showed that Dr. Babcock failed to use properly the underlying data in his own model. Specifically, Dr. Babcock failed to confirm the accuracy of the data he received from Plaintiffs' appraisers. Tr. 2813:2-7 (Sunding) (eighteen of Dr. Babcock's property transactions could not even be located in the public records); Tr. 2813:11-2814:4 (Sunding) (three of Dr. Babcock's property transactions were misclassified in the wrong river basin). Additionally, in analyzing the property transaction data he received from Plaintiffs' appraisers, Dr. Babcock intentionally excluded several key data points that significantly affect property values: (a) improvements on the land, (b) farm size, and (c) flood risk as reflected by distance from the river. Tr. 2814:22-2815:13 (Sunding). Dr. Sunding explained in detail the importance of each of these variables, and how they each affect farmland value. Tr. 2815:14-2817:19 (Sunding); DX 7022-0026 (map reflecting key property information that Dr. Babcock omitted from his analysis). Once Dr. Sunding fixed Dr. Babcock's mistakes and incorporated the property variables that Dr. Babcock had omitted, Dr. Babcock's own data and his own model (with its flawed 2011 trigger date) revealed *no statistically significant change* in land prices in the Missouri bottomlands. Tr. 2817:20-2819:21 (Sunding). "So here's what happens when you add the additional controls that Dr. Babcock had and when you correct the data errors in his analysis, well, now we've crossed a threshold. Now there's no statistically significant drop in land prices in the Missouri bottomlands after January 2011." Tr. 2818:21-2819:1 (Sunding).

307. As part of his assessment of the variables that Dr. Babcock had omitted from his model, Dr. Sunding even took the extra step of testing the validity of Dr. Babcock's model and assumptions on a more limited subset of property transactions that were within FEMA's 500-year floodplain, and which would unquestionably face flood risk from the Missouri River. *See* Tr. 2819:22-2824:8 (Sunding). Dr. Sunding conducted this analysis because many of the

property transactions in Dr. Babcock's model were several miles away from the river, and clearly faced less flood risk than those properties closer to the river. Tr. 2816:15-17 (Dr. Sunding identifying properties more than *six miles* away from the river). Dr. Sunding's goal in this part of his analysis was to avoid any confusion about whether distance-from-the-river might skew Dr. Babcock's results, by focusing only on a limited subset of properties that everyone could agree faced a legitimate flood risk from the river: "I tried a test where I ran Dr. Babcock's model on a subset of data, namely parcels within the FEMA 500-year floodplain." Tr. 2820:20-24 (Sunding). But Dr. Babcock's model failed even this modest cross-check: "if [Dr. Babcock's] hypothesis of a decline in land value following the beginning of 2011 is correct, then parcels within the FEMA flood zone should certainly show evidence of such a decline. However, I find that they don't." Tr. 2823:11-15; Tr. 2824:3-8 (Sunding).

308. Fifth, Dr. Sunding showed that Dr. Babcock's model is fatally flawed because it evaluates (at best) only the relative values of farmland properties in only four specific counties in Iowa. Tr. 2824:9-2825:17 (Sunding). Those four Iowa counties are not even in the same state as two of the Plaintiffs' properties: Ideker (Missouri) and Buffalo Hollow (Kansas). And the four Iowa counties Dr. Babcock studied are nearly 60 miles away from the nearest of the Plaintiffs' properties. Tr. 2824:15-2825:17 (Sunding); DX6033-0016 (map showing long distance from Dr. Babcock's study area to Plaintiffs' properties). Moreover, Dr. Babcock actually received data from Plaintiffs' appraiser that included many property transactions in those other states, several of which were quite close to Plaintiffs' own properties. Tr. 2825:21-2827:12 (Sunding); DX6033-0016 (map showing as green dots the many relevant property transactions Dr. Babcock omitted). But incredibly, Dr. Babcock refused to incorporate that highly relevant data into his model: "So Dr. Babcock had all of that additional information that, to me, looks plenty relevant,

but he chose not to include it. So let's ask the question. What happens if I add that information back in?" Tr. 2827:8-12 (Sunding). The reason – as Dr. Sunding discovered – is that when all of Plaintiffs' appraisers' property transactions are incorporated into Dr. Babcock's model, the clear result is that there is no statistically significant change in modeled property values: "when one includes this information from other states, the point estimate on the drop in value on the Missouri Basin -- or in the Missouri mainstem is now only minus 2.8 percent, with our usual wide confidence interval from negative 17 percent to plus 11.6 percent, so this is a small estimate, not close, to statistically significant." Tr. 2832:18-2833:1 (Sunding); DX7022-0024 (reflecting the results of Dr. Babcock's own model after adding back in the data he omitted); DX6033-0021 (same); DX6033-0008 (same).[23] "[T]his is not any additional information I'm adding. This is information that Dr. Babcock had when he ran his model initially. So when one adds this data from other states back into the model, what you find is that there's no statistically significant drop in prices along the Missouri mainstem following January 2011." Tr. 2831:17-2832:2 (Sunding); DX7022-0034 (reflecting the results of Dr. Babcock's own model after adding back in the data he omitted); DX6033-0021 (same); DX6033-0008 (same).

309. Sixth, Dr. Sunding showed that Dr. Babcock's property-specific adjustments have no reliable scientific basis. Tr. 2834:24-2838:20 (Sunding). Specifically, Dr. Sunding explained the proper way Dr. Babcock could have addressed each individual Plaintiffs' property value change (if any): "if Dr. Babcock had wanted to estimate different effects for different Plaintiffs, he could have used a model with so-called heterogenous [*sic*] treatment effects, and the appropriate way

[23] On cross-examination, Plaintiffs tried to suggest that Dr. Sunding's results somehow excluded properties outside the 500-year floodplain. But Plaintiffs were clearly misstating Dr. Sunding's findings: "this analysis is not limiting just to data in the 500-year floodplain." Tr. 2833:14-15 (Sunding).

to do that would be to explicitly incorporate them into his econometric model, by, for example, interacting his treatment effects, the time period dummy variables, with farm specific characteristics, such as buildings, levees and soil quality." Tr. 2836:8-18 (Sunding). But instead, Dr. Babcock conducted only a subjective ad hoc adjustment without any reliable methodology at all: "Dr. Babcock produces Plaintiff specific estimates of percent diminution in property value by applying what I would characterize as an ad hoc adjustment to his model that is subjective and unscientific." Tr. 2835:12-16 (Sunding). Dr. Sunding further explained that Dr. Babcock also improperly mixed apples and oranges when he applied his parcel-specific adjustments to appraisal results that had not properly accounted for changed flood risk at the comparable properties incorporated into the appraisals. Tr. 2837:5-2838:20 (Sunding).

310. "So my last opinion is a summary opinion. It's not shown on this page, but it's a sum total of, you know, our bottom line of what I think about Dr. Babcock's analysis. It's simply not plausible that the average price of farmland in the Missouri bottomlands suddenly dropped by 38 percent seven years at after implementation of the MRRP as Dr. Babcock's model implies. A more likely explanation for his findings is that his small unrepresentative dataset leads him to a conclusion that's not justified by the facts in this case or by common sense. After specifying a proper model, a proper difference-in-difference model, to test for a diminution in farmland prices that includes other relevant explanatory factors and data from other states in the regions outside his four-county area, I conclude, Your Honor, that there is, in fact, no reliable evidence of a drop in farmland prices in the Missouri Basin after January 1st, 2011. Tr. 2748:6-2749:3 (Sunding).

C. Dr. Bateman's Opinions Regarding Plaintiffs' Crop Losses Are Flawed and Contrary to the Evidence

311. Plaintiffs, through Dr. Bateman, asserted that the three Phase II Plaintiffs had each suffered severe crop losses as a result of flooding. However, Dr. Bateman's opinions are inconsistent with the evidence in the case, and are not reliable.

1. Dr. Bateman Admitted on Cross-Examination that his Model and Findings Are Flawed and Inconsistent With the Evidence

312. Dr. Bateman has no experience working as an expert in an inverse condemnation case or determining economic losses associated with flowage easements. Tr. 724:16-25 (Bateman). He did not perform an appraisal. Tr. 729:11-13 (Bateman). Dr. Bateman is not a hydrologist or engineer and was not told by Christensen, Mays, or any other hydrologist that the Phase II properties would have experienced no flooding in damages years in the absence of the MRRP. Tr. 735:19-737:10 (Bateman).

313. Economists use marginal analysis to determine the marginal impact of flooding from the Corps' actions. Econometric modeling allows economists to tease out the marginal effect of Corp action. Tr. 733:22-735:8 (Bateman). The Corps action occurred prior to 2007 and has not been rescinded. Yet, Dr. Bateman assesses different takings for each damage year but doesn't know what government action caused increased marginal flooding in any given year. Tr. 725:1-17, 727:5-728:3 (Bateman).

314. The Bateman model is binary: it either assigns all difference from modeled yield to the Corps or it assigns none of the difference from modeled yield to the Corps. Tr. 731:17-732:11; 733:13-17; 3283:18-24 (Bateman). Dr. Bateman assumes that in the absence of the MRRP, there would have been no flooding in his damages years. Tr. 735:14-18 (Bateman). For example, he explains that his "but-for" graphs illustrate his assumption that actual yields would have matched modeled yields in the absence of the MRRP. Tr. 743:3-749:7 (discussing Bateman Slide 64). The

Bateman model does not analyze whether any other weather events affect yields, other than flooding. Tr. 732:12-733:12 (Bateman). Yet, Dr. Bateman admits that Drought, hail, heat, and other weather events beyond flooding can impair crop yields. Bateman reviewed crop insurance reports for the Phase II bellwethers that he did not account for in his damages model. Tr. 741:5-743:2 (discussing DX 4197, 4193, 4195). He also admits there is a difference between a finding of cause for higher water surface elevations and a finding of the cause of crop losses. Tr. 3284:22-3285:1 (Bateman). Bateman's analysis is flawed because it assumes crop yields would be average to above-average but for the MRRP and ignores that there were years when crop yields were below average before 2004 because of high river levels and other reasons. Tr. 2507:21-24 (Evans); Tr. 127:18-25 (Buffalo Hollow acknowledging below average yields before 2004 due to excess water).

315. Bateman's methodology to derive a trend line is unreliable. First, the analysis includes data only for years with average and above-average yields. Tr. 3335:8-25 (Bateman). Yet, as a matter of statistics, one would not want to predict crop yields based only on data reflecting above and above average years because doing so would tend to skew the trend line upward. Tr. 3334:9-3335:7 (Bateman). Second, Dr. Bateman ignored that corn and soybean yields were below the trend line from non-MRRP flooding before 2004, but agreed that one would not expect the yields post-2004 to match the trend line every year. Tr. 3330:3-23; 3331:12-24 (Bateman); DX4647-30; DX4647-31; DX4647-42; DX4647-43, DX4647-54. Dr. Bateman did not consider crop yield data from the 1990s in deriving a trend line. Tr. 3325:22-3326:1 (Bateman).

316. An economist would expect that a permanent right to use land would involve the buyer paying a lump sum in exchange for that permanent right, not paying hypothetically lost profits for some period of years or paying hypothetically lost profits for some period of years to be

followed by a lump sum payment. Tr. 729:2-730:7, 730:15-25 (Bateman). Yet, The Bateman model measures the economic opportunity lost when Plaintiffs farming was frustrated. Tr. 728:14-18 (Bateman). Dr. Bateman admits that the Corps did not appropriate crops for its own use. Tr. 728:4-13 (Bateman).

317. Dr. Bateman uses national data to model his year-over-year yield increases, even though there are yield data at the regional, state, and county levels. Tr. 737:11-20 (Bateman). He opines that year-over-year productivity increases are due to improved farming practices but conducted no analysis to verify this opinion. Tr. 737:21-738:5 (Bateman). His baseline yield for each crop and for each farm is not set on a uniform set of years and ranges from 2003 through 2009, depending on the crop and farm. Tr. 738:24-740:3 (Bateman) (discussing DX 4191). Dr. Bateman's criticisms of Dr. Evans' opinion that farming yields increase every few years due to different farming methods or inputs, rather than gradually every year, is inconsistent with plaintiff testimony. The Adkins Partnership yields have stayed approximately the same for the representative property since the 1990s when they began using a lower compaction no till farming method. Tr. 3336:4-3338:17 (Bateman). Yet, Dr. Bateman applied a trend line assuming yields increased every year. *Id*.

318. The Bateman model socializes all losses of landowners experienced in damages years. Tr. 733:18-21 (Bateman).

319. Plaintiffs presented no evidence about the crop losses on the Adkins representative property alone and Dr. Bateman's opinions grouping the representative property with the non-representative Adkins tracts is inadmissible because it violates the Court's Order; the opinions are also unreliable. Dr. Bateman calculated crop losses based on a tract of approximately 1870 acres –rather than the 950-acre Adkins representative property. Tr. 3289:9-3291:20; 3292:8-12

(Bateman); DX6114 at 30. Dr. Bateman also derived his trend line based on both the representative and non-representative property. Tr. 3292:15-3293:1 (Bateman). The Court's October 15, 2019 Order limited discovery to the representative properties. ECF No. 507. All opinions on the Adkins property are unreliable because Dr. Bateman did not consider or analyze how the flooding on the representative property compared to the non-representative property. Tr. 3299:23-3300:24 (Bateman). Thus, there is no basis to believe average crop yields or crop losses averages are comparable on the representative property only.

320. For the prevented planting on the Buffalo Hollow farm, Dr. Bateman cannot explain where the additional 45 acres planted after 2007 was located. Tr. 750:7-753:3 (discussing DX 4198); 753:14-754:13; 754:20-755:4 (Bateman). He tried to fix an erroneous double-counting of replanted crops on the Buffalo Hollow farm that was pointed out in his deposition. But in his fix, Dr. Bateman escalates and double counts the operating costs. Tr. 757:8-761:15 (Bateman).

321. Dr. Bateman assessed a fee taking value for 18 acres of land on the Ideker farm that was scoured in 2010 based on a December 31, 2014, valuation Mr. Keller performed, because he thought that Mr. Keller developed a 2010 appraisal. Dr. Bateman also awards fee value for the 18 acres, lost productivity on the same 18 acres through harvest, and reclamation costs. Tr. 762:23-764:4; Tr. 768:9-14; Tr. 769:22-770:6 (Bateman). For the replacement value for the buildings on the Ideker farm, he did not know when the buildings were constructed, he does not depreciate the value of the buildings, and he does not know how the new building is a replicate of the building that was replaced. Tr. 775:14-777:7 (Bateman). Dr. Bateman does not evaluate whether a hypothetical buyer of the Ideker farm would reproduce the improvements that he calculated replacement costs for. Tr. 778:14-20 (Bateman).

322. Dr. Bateman's reclamation costs are aimed at reducing future flood risk. But he does not calculate what reduction in flood damage is based on these forward-looking reclamation costs. Tr. 770:7-774:10 (Bateman). For reclamation costs that address damages to floods, Dr. Bateman does not depreciate the value of the damaged improvements (e.g., fencing and electric motors) nor does he know whether the fixtures would have been damaged in the absence of MRRP. Tr. 774:11-775:25; 777:12-778:13 (Bateman).

323. Dr. Bateman equates replacement costs with market value. Tr. 775:20-22 (Bateman).

324. Dr. Bateman opines that interest on just compensation should be calculated by adopting a 50/50 equity-bond investment portfolio that is rebalanced annually and subject to an annual management fee. Tr. 784:14-788:1 (Bateman). Yet, he is unaware of any instance where the CFC adopted an equity or equity-bond index to calculate interest on just compensation. Tr. 785:2-8 (Bateman). He is also unaware of any instance where the CFC rejected a diversified mutual fund that included stocks and bonds for determining interest on just compensation in an inverse takings case. Tr. 785:21-786:1 (Bateman). Dr. Bateman's investment portfolio is based on a financial fiduciary standard which calls for investments to be tailored to individuals. Tr. 788:9-20; 789:5-11; 790:23-791:1 (Bateman). The Bateman portfolio has a volatility of 9.22, which he knew was high. Tr. 792:2-25 (Bateman). There is a negative return on the AGG and SPY funds in the Bateman portfolio for different years. Tr. 793:7-794:24 (Bateman) (discussing Bateman Slide 85 and DX 4206).

2. Dr. Evans Showed that Dr. Bateman's Opinions are Flawed, and that Plaintiffs Suffered Minimal Crop Losses in Most Years

325. Dr. Evans extended Dr. Bateman's trend yield line back in time for each of the representative properties to see if the reported actual (not simulated) yield for the 1990s matched Dr. Bateman's trend. Tr. 2509:9-20, 2510:14-19, Tr. 2515:2-6, Tr. 2518:12-19 (Evans). They did

not. Over the 14 year period from 1990 to 2003, corn yield on the Ideker property fell short of the trend yield 8 of the years and soy yield fell short of the trend line every year until 2004. Tr. 2510:4-10 (Evans); DX4647-30 (Deviations from Bateman's corn trend line); DX4647-31 (Deviations from Bateman's soy trend line). Over the 14 year period from 1990 -2003, corn yield on the Adkins property fell short of the Bateman trend yield 8 of the years and 11 of the years. Tr. 2515:7-14 (Evans); DX4647-42 (Deviations from Bateman's corn trend line) DX4647-43 (Deviations from Bateman's soy trend line). Over the fourteen year period from 1990–2003 corn yield on the Buffalo Hollow property fell short of the trend yield in eight of the years and soy yield fell short of the trend line in nine of the years. Tr. 2518:17-24 (Evans); DX4647-54 (Deviations from Bateman's trend line). The Fact that Plaintiffs were not achieving Bateman's trend yield before the Corps action reveals a fatal flaw in Dr. Bateman's analysis – his assumption that but-for river management would result in ideal production conditions on the representative property in every year. Tr. 2351:15-2352:12 (Evans). The result of this flawed assumption is that Dr. Bateman grossly inflates the damages caused by higher water surface elevations attributed to the Corps. *Id.*[24]

3. Dr. Sunding Showed that Dr. Bateman's Crop-Loss Calculations are Flawed and Unpersuasive

326. Dr. Sunding explained that Dr. Bateman's calculation of Plaintiffs lost farming profits is based on several flawed assumptions. Tr. 2844:8-2855:22 (Sunding). *First*, Dr. Bateman's nationwide projections of crop yields are overly simplistic, and fail to take into account local

[24] Dr. Bateman further overestimated the total yield damages on the Adkins property by overestimating the tillable acreage on the representative property by 312-501 acres a year, depending on crop and year. Tr. 2352:14-2357:7 (Evans); DX4647-15 (Plaintiffs' interrogatories listing the Adkins acreage as 1,800 acres, nearly twice the acreage of the 950 representative property).

fluctuations in yields: "the regressions Dr. Bateman relies on are too historical, too long term, and too aggregate to be used to credibly predict crop yields on a particular parcel in Missouri, for example, in 2011." Tr. 2845:9-2846:17 (Sunding). Dr. Sunding compared Dr. Bateman's nationwide averages against actual county-level crop yields in the specific regions where Plaintiffs are located, and showed that Dr. Bateman's figures are significantly inflated. Tr. 2846:23-2849:6 (Sunding); DX6033-0026 and DX6033-0027 (charts showing that Dr. Bateman's projected nationwide yields for corn and soybeans are substantially higher than actual regional yields in Missouri, Iowa, and Kansas in the relevant years). "And this leads me to conclude that Dr. Bateman's but-for assumptions overstate what yields would have been in the absence of the MRRP, and part of the reason is he's not accounting for the other factors that might drive down crop yields, like poor precipitation or windy conditions or pest pressures, or any one of the other risks that farmers, you know, that farmers face." Tr. 2848:23-2849:6 (Sunding). *Second*, Dr. Sunding explained that Dr. Bateman's model of lost farm profits assumes that the Corps is responsible for 100% of all flooding along the Missouri River, while Dr. Sunding's calculations reflect only the incremental level of lost farm profits associated with incremental increase in flooding. Tr. 2849:8-2850:8 (Sunding). *Third*, Dr. Sunding described a number of other corrections he made to Dr. Bateman's calculations - including corrected crop price data, corrected acreage totals, and eliminating Dr. Bateman's mistaken double-counting of certain costs – although Dr. Sunding acknowledged that those other corrections resulted in relatively smaller changes to Dr. Bateman's totals than the first two issues. Tr. 2850:9-2853:20 (Sunding).

327. After correcting Dr. Bateman's errors, Dr. Sunding provided his own detailed calculations of each Plaintiff's lost farming profits for each year at issue. Tr. 2853:21-2855:22

(Sunding); DX6033-0030 (table listing full calculations of Plaintiffs' lost farm profits for each year).

D. Other Evidence Reveals that Plaintiffs' Crop and Property Loss Claims Are Not Reliable

1. Adkins Crop and Property Loss Claims Are Contrary to the Facts

328. Mr. Adkins testified that Dr. Bateman calculated the Partnership's total crop losses to be $296,378 for 2007, $582,069 for 2008, and $892,926 for 2010, for a total loss of $1,771,373 without interest. Tr. 62:13-14, 68:5-6, 68:15-20 (Adkins Partnership). However, the Partnership's Schedule F tax documents indicate significant profits in the same years when flooding was claimed, $570,834 in profits for 2007, $534,375 for 2008, and $1,024,284 for 2010. Tr. 122:17-22 (Adkins Partnership); *see also* DX4048, 4049, 4051 (IRS Schedule F for 2007, 2008, 2010). *See also* DX6033-0030 (Dr. Sunding's analysis of crop profit losses).

329. Mr. Adkins testified that Dr. Babcock calculated the total diminution in fair market value of his property to be $1,530,268. Tr. 75:20-23 (Adkins). Mr. Adkins stated that in his opinion, the land was worth around $3,000 per acre as of 2014. *Id.* at 105:5-23 (Adkins). However, Mr. Adkins had an appraisal conducted of his mother's estate, which concerns property within the representative property, and as of March 2019, the average price per acre was $10,500. Tr. 112:8-11, 17-20 (Adkins); *see also* DX4137 (Farmers National appraisal).

2. Buffalo Hollow Crop and Property Loss Claims Are Contrary to the Facts

330. Buffalo Hollow's average yields for corn at 207.23 bushels per acre in 2013 was higher than all other yields from 2005 to 2018, except for 2009 and 2017. Tr. 193:11-14 (Buffalo Hollow); *see also* DX5318 (Gerald Schneider's prepared crop yields on the representative property 2005 to 2018). The average corn yields on the full Buffalo Hollow property, which includes the representative property, were higher for 2013 and 2014 than the farm's average corn

yields in 2000, 2001, 2002, 2004, 2005, and 2006 when no flooding occurred on the property. Tr. 194:14-195:2, 196:2-7 (Buffalo Hollow); *see also* DX5110 (Gerald Schneider's prepared crop yields on full Buffalo Hollows property 2000 to 2019), Additionally, the corn yields were higher for 2016 and 2017 than the farm's average corn yields were in 2000, 2001, 2002, and 2003 when no flooding occurred on the property. Tr. 196:8-16 (Buffalo Hollow); *see also* DX5110 (Gerald Schneider's prepared crop yields on full Buffalo Hollows property 2000 to 2019). *See also* DX6033-0030 (Dr. Sunding's analysis of crop profit losses).

3. Ideker Farms' Crop and Property Loss Claims Are Contrary to the Facts

331. The claimed flooding in 2013, 2014, and 2015 had no appreciable effect on crop yields. Ideker Farms' own records estimate zero crop losses in those years. Tr. 277:10-12, 18; 277:19-22; 278:4-7 (Ideker Farms). Furthermore, Ideker Farms' average yields for corn in 2013 and 2014 were higher than the farm's average corn yields in 2004, 2005, 2006, and 2009 when no flooding occurred on the property. *Id.* at 280:16-281:16; 279:17-25. Roger Ideker could not answer whether the flooding in 2013, 2014, and 2015 was significant as it pertains to crop yields. *Id.* 274:5-11. According to Roger Ideker, the flooding was significant only as to the fifty-five acres between the levee and the river. Tr. 272:25-274:4 (Ideker Farms). *See also* DX6033-0030 (Dr. Sunding's analysis of crop profit losses).

E. Dr. Evans Provides Reliable Evidence of the Crop Yield Impacts from Increased WSEs that the Court Attributed to the MRRP

332. The United States' agricultural engineering expert Dr. Robert Evans modeled the effects of increased WSEs on the representative properties. Around "70 percent of the year-to-year variation in crop yield is related to water, sometimes too much, sometimes too little, sometimes both." Tr. 2355:19-23 (Evans). "An assessment of the impacts of MRRP on crop yield requires accounting for water table elevation, duration, and timing relative to crop sensitivity." Tr.

2347:17-20 (Evans). "Simulation analysis accounts for these inherent conditions and provides a reliable estimate of the [MRRP] impacts on yield." Tr. 2347: 21-24 (Evans). An effective crop model must be able to consider hydrologic conditions and, for this application, the model must also be efficient at predicting crop yield response to wet conditions. Tr. 2355:23-2356:2 (Evans).

333. To perform his analysis, Dr. Evans selected DRAINMOD, a water management simulation model originally developed in the 1970s to quantitatively integrate crop requirements into the design and management of agricultural water management systems. Tr. 2356:15-22 (Evans). DRAINMOD accounts for water related stressors impacting yields. Tr. 2357:1-4 and 2366:4-20 (Evans). DRAINMOD performs water balances on an hour-by-hour, day-by-day basis considering weather, soil products site conditions and crops. Tr. 2363:20-22 (Evans). It simulates the components of the hydrologic cycle, keeping track of the water table depth over time and does so for long periods of weather records. Tr.2363:23-2364:3 (Evans).

334. DRAINMOD was selected because it has been proven to effectively simulate yields in flat, poorly drained soils. Tr. 2357:6-10. The model has been extensively tested through the United States and globally, having been independently tested, in at least 15 states including Iowa, and an additional 15 countries. Tr. 2364:5-10 (Evans). In Fact, DRAINMOD was adopted in the 1980s by the USDA Natural Resources Conservation Service as a national tool for design and evaluation of drainage and water related management systems in shallow water table soils. Tr. 2358:9-13 (Evans). It has been used routinely in the Midwest to evaluate farming management practices. Tr. 2358:20-2359:1 (Evans). DRAINMOD simulates crop yields in response to rainfall and water logging, a key feature in shallow water table soils like the Plaintiffs' representative properties. Tr. 2357:17-2358:8 (Evans). Additionally, DRAINMOD's water balance approach is relatively simple to use compared to models requiring a numerical

solution to the Richards equation. Tr. 2357:11-13 and Tr. 2359:3-2361:12 (Evans); DX7007-34 (Water Balance Diagram); DX4590-24. Even though the approach is simpler, the results are comparable. Tr. 2361:13-2362:13 (Evans); DX7007-36; DX4640 (sic); DX4629; Tr. 2364:15-2365:6 (Evans); and DX7007-41 (Iowa study comparing DRAINMOD to another model). Further, its required input parameters are reasonable to obtain either through direct measurement or from the literature. Tr. 2357:14-16 (Evans). Finally, Dr. Evans has extensive experience applying DRAINMOD in field scale applications, which is exactly how he used it here. *Id.* at 22-23.

335. Before beginning to model the effects of increased water surface elevations on crop yields, Dr. Evans reviewed thousands of exhibits, including maps, yield data, well borings, and groundwater documents. Tr. 2353:20-2354:1 (Evans). He compiled reported yield information from crop insurance reports, USDA RMA Actual Production History reports, USDA FSA 578 forms, FSA aerial maps, Plaintiff notes, combine harvester yield maps for the Buffalo Hollow property, and Plaintiffs' responses to the U.S. first set of Phase II. Interrogatories (although these were not received until March 30th). Tr. 2386:18-2387:22 and 2388:12-2390:22 (Evans).

336. He also conducted a two-day site visit to each property where he noted site conditions important to his simulation analysis, took soil borings of 9-9.5 feet, located the aquifer depth, and assessed hydraulic conductivity. Tr. 2354:2-5 (Evans); Tr. 2373:5-2376:12; DX7007-56 (soil sample photos); DX7007-57 (auger hole photos); DX4593-2 (23 Adkins soil boring locations); DX4593-3 (16 Ideker soil boring locations); DX4593-4 (16 Buffalo Hollow soil boring locations); DX4602A-8, 19, 29, and 37 (photos of culverts); DX4602A-13 and 24 (photos of floodgates); DX4602A-3, 28 and 37 (photos of ditches).

337. Dr. Evans then selected input parameters. Input parameters included weather, soil, site, and crop parameters. Tr. 2368:11-2373:3(Evans). Soil inputs were determined using the USDA Rosetta model. This model is also used to estimate water retention and saturated and unsaturated hydraulic conductivity.[25] Tr. 2372:1-21 (Evans); DX 7007-54 (USDA Rosetta website). WSE input data came from Plaintiffs' Phase I expert Dr. Christensen (2001-2015) and the United States expert, Dr. Robert Holmes (1990-2000 and 2016-2018). Tr. 2378:5-8 (Evans). WSEs dating back to 1990 were used to lengthen the period of simulation analysis and understand the historical relationships between river water surface elevations, ponding on the parcel, and reported crop yield. *Id.* at 9-14. Because yields were not reported on a field by field basis, Dr. Evans developed a method to account for obvious spatial differences that could result in varying hydrologic conditions from field to field on each parcel, including soil type, ground elevation, distance to or from the river, and irrigation. Tr. 2391:4-13 (Evans). Each parcel was then divided into 1 meter square units each assigned a soil type, elevation, distance and irrigation type. *Id.* at 2391:14-2399:7 (Evans); DX7007-79 (Adkins maps showing soil types); DX7007-80 (Adkins topographic and soil map); DX7007-81 (Adkins topographic map showing soil, and distance to the river): DX7007-84 (Ideker topographic map showing, soil, distance to the river, and irrigation); DX7007-87 (Buffalo Hollow topographic map showing soil, distance to the river, and irrigation).

338. For an established model like DRAINMOD with observed data as an important output variable, it is customary for agricultural engineers to calibrate the model against the observed data. Tr. 2381:8-12 (Evans). In this case, because DRAINMOD is an established model and he

[25] To the extent Plaintiffs argue that Dr. Evans' model does not account for unsaturated flow, Plaintiffs are simply incorrect.

utilized measured and observed data, Dr. Evans utilized the calibration approach. *Id.* at 13-17. Dr. Evans first calibrated his model with groundwater data from four USGS wells in the vicinity of the representative properties. Tr. 2381:19-24 (Evans); DX7007-71 (table describing Evans USGS calibration procedure); The goodness of fit for all four wells had a satisfactory model efficiency rating. Tr. 2382:17-25 (Evans).[26] DRAINMOD was able to effectively simulate the timing and duration that the groundwater was near the land surface at each of the four USGS wells. Tr. 2386:7-10 (Evans); DX7007-71 (table describing Evans USGS calibration procedure); Tr. 2383:15:24 (Evans); DX7007-72 (USGS Well 1comparison data assembled from DX4590-43-44 and DX4578-17); Tr. 2384:11-21 (Evans); DX7007-73 (USGS Well 2 comparison data assembled from DX4590-44-45 and DX4578-19-20); Tr. 2385:3-18 (Evans); DX7007-74 (USGS Well 3 comparison data assembled from DX4590-45-46 and DX4578-22-23); Tr. 2385:22-2386:10 (Evans); DX7007-75 (USGS Well 4 comparison data assembled from DX4590-46-47 and DX4578-27-28).

339. Next, Dr. Evans calibrated his model by comparing the simulated actual yields to the Plaintiffs reported yields. Tr. 2345:18-22 and 2346:2, 2346:4-6 (Evans). Tr. 2386:15-17 (Evans). To simulate crop yield, for the actual river management condition, Dr. Evans and his team, started with the input parameters that provided the best fit of the simulated groundwater levels to

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[26] Plaintiffs are likely to argue that Dr. Evans model is not reliable because some of his results contain a high average error. However, this criticism is misleading and should be disregarded because Plaintiffs cherry picked the data and did not utilize the standard statistical procedure of calculating average mean error. Tr. 2621:1-22; 2640:21-2542:2; 2650:8-20 (Evans). Dr. Bateman's analysis of Dr. Evans' supposed errors omits pertinent data and ignores undisputed facts. Dr. Bateman presented a "percent error" comparing Dr. Evans' simulated actual results with his own computed "actual" yields for only years where the alleged "error" is the highest. Dr. Bateman presented no comparison where Dr. Evans' actual simulated yields closely replicated the yields Dr. Bateman used. Tr. 3315:16-3316:2 (Bateman)1; DX4590-69 (Bateman agreeing that Dr. Evans' simulated actual yields are almost the same as the Ideker Farms actual yields).

the water levels in the USGS wells. Tr. 2390:24-2391:3 (Evans). Initial simulations analyses were conducted to determine what input parameters the yield was most sensitive to. Tr. 2400:3-2401:11 (Evans). Once those were determined, those input parameters were adjusted during calibration to get the best fit between simulated actual yield and actual reported yield. *Id.* Input parameters were only adjusted to values within reported ranges for that parameter. Tr. 2401:12-21 (Evans). "Model efficiency is a standard statistical parameter that is calculated to compare model effectiveness." Tr. 2403:17-19 (Evans). The Model efficiency values for the Ideker and Buffalo Hollow farms are in the good to very good range for all yield reporting units. Tr. 2404:9-11(Evans); DX4590-56; Tr. 2425:16-2426:6 (Evans). The model efficiency values for 96% of the Adkins representative property were either good or satisfactory. Tr. 2404:12-2405:9 (Evans); DX4590-56; Tr. 2426:20-2427:2 (Evans). The goodness of fit between the reported and simulated corn yield for the pooled data for all sites has a model efficiency rating of .87 and a coefficient of determination R square of .9, which is considered very good. Tr. 2405:12-24 (Evans); DX4590-57 (Goodness of Fit data for Corn); *see also*, DX4590-69 (Ideker comparison of modeled to actual non-irrigated corn yields); DX4590-70A (Ideker comparison of modeled to actual irrigation corn yields); DX7007-102 (derived from DX4590-92, DX4590-93A and DX4590-93B, Buffalo Hollow comparison of modeled to actual non-irrigated corn) DX7007-103 (derived from DX4590-91 and DX4590-92, Buffalo Hollow comparison of modeled to actual irrigated corn); DX4509-119 (Adkins sections 21 to 28 comparison of modeled to actual corn yields). The goodness of fit for corn is also similar to the results reported in corn yield modeling studies using different crop models. Tr. 2406:1-12 (Evans); DX7007-92 (comparison of corn yield modeling studies). The goodness of fit between the reported and simulated soybean yield for the pooled data for all sites has a model efficiency rating of .74 and a coefficient of

determination R square of .78, which is considered good. Tr. 2406:14-23 (Evans); DX4590-58; *see also*, DX4590-70B (Ideker comparison of modeled to actual non-irrigated soybean yield); DX4590-71 (comparison of modeled to actual irrigated soybean yield); DX7007-104 (derived from DX5490-95A, DX4590-95B and DX4590-96, comparison of modeled to actual non-irrigated soybean yield); DX7007-105 (derived from DX4590-94A and DX4590-94B, Buffalo Hollow comparison of modeled and reported irrigated soybean yield). The goodness of fit for soybeans are also similar to the results reported in soybean yield modeling studies using different crop models. Tr. 2406:24-2407:8 (Evans); DX7007-92 (comparison of soybean yield modeling studies).

340. After calibrating the model, Dr. Evans modeled crop yields that would have occurred from 2004 to 2015 in the but-for river management condition and compared the expected, or modeled but-for yields with modeled actual yields to determine the difference in impact to Plaintiffs' crop yields resulting from the Corps actions. Tr. 2344: 12-19; Tr. 2345:23-2346:3; Tr.2428:7-13 (Evans). The but-for yields were simulated with identical input parameters as the modeled actual yields except that Dr. Christensen's actual water surface elevations were replaced with Dr. Christensen's but-for water surface elevations. Tr. 2346:7-11 and Tr. 2427:18-2428:6 (Evans). According to Dr. Evans, the difference between the simulated actual yield and the simulated but-for yield represents, "the best estimate of the impact of MRRP on Plaintiff yields because the simulation approach accounts for the inherent conditions of the properties." Tr. 2346:12-14 (Evans); *see also*, Tr.2427:11-16 (Evans). "The comparison must be between simulated actual and simulated but-for to provide a true estimate of the impacts of MRRP" because any factor or factors that cause the model to under or over predict yield impacts would have nearly the same effect on the but-for scenario allowing for an apples to apples comparison.

Tr. 2428:14-2431:18 and Tr. 2434:23-2435:9 (Evans). His results, reported below, are conservative. Tr. 2644:11-2645:23 (Evans).

1. Adkins Crop Loss Info

341. Soy yield impacts landward of the levee in 2007 were only -0.07 bushels per acre and the total impact was only -36 bushels. DX7007-201, adapted from DX4590-127 (Adkins impact Summary Chart). There were no soy yield impacts riverward of the levee in 2007. DX7007-202 adapted from DX4590-128 (Adkins impact summary chart). Corn yield impacts landward of the levee in 2007 were -14.86 bushels per acre and the total impact was -4,636 bushels. DX7007-203 adapted from DX4590-129 (Adkins impact summary chart). Corn yield impacts riverward of the levee in 2007 were -53.77 bushels per acre for a total impact of -4,484 bushels. DX7007-204 adapted from DX4590-130 (Adkins impact summary chart).

342. Soy yield impacts landward of the levee in 2008 were -13.26 bushels per acre and the total impact was -4,136 bushels. DX7007-201, adapted from DX4590-127 (Adkins impact Summary Chart). Soy yield impacts riverward of the levee in 2008 were -29.14 bushels per acre and the total impact was -2,430 bushels. Tr. 2488:21-2489:2 (Evans). DX7007-202 adapted from DX4590-128 (Adkins impact summary chart). Corn yield impacts landward of the levee in 2008 were -44.45 bushels per acre and the total impact was -22,696 bushels. DX7007-203 adapted from DX4590-129 (Adkins impact summary chart). There were no corn yield impacts riverward of the levee in 2008. Tr.2489:16-21 (Evans); DX7007-204 adapted from DX4590-130 (Adkins impact summary chart).

343. Soy yield impacts landward of the levee in 2010 were -32.08 bushels per acre and the total impact was -10,006 bushels. DX7007-201, adapted from DX4590-127 (Adkins impact Summary Chart). Soy yield impacts riverward of the levee in 2010 were -46.31 bushels per acre and the total impact was -3,862 bushels. Tr. 2488:21-2489:2 (Evans). DX7007-202 adapted from

DX4590-128 (Adkins impact summary chart). Corn yield impacts landward of the levee in 2010 were -114.83 bushels per acre and the total impact was -58,629 bushels. DX7007-203 adapted from DX4590-129 (Adkins impact summary chart). There were no corn yield impacts riverward of the levee in 2010. Tr.2489:16-21 (Evans); DX7007-204 adapted from DX4590-130 (Adkins impact summary chart).

344. Cumulative soy yield impacts landward of the levee at the Adkins representative property for all claim years were -14,177 bushels. Tr. 2488:11-19 (Evans). DX7007-201, adapted from DX4590-127 (Adkins impact Summary Chart). Cumulative soy yield impacts riverward of the levee at the Adkins representative property for all claim years were -6,292 bushels. Tr. 2488:21-2489:2 (Evans); DX700-202 adapted from DX4590-128 (Adkins impact summary chart). Cumulative corn yield impacts landward of the levee were -85,960 bushels. Tr. 2489:3-10 (Evans); DX7007-203 adapted from DX4590-129 (Adkins impact summary chart). Cumulative corn yield impacts riverward of the levee were only -4,484 bushels. Tr.2489:16-21 (Evans). DX7007-204 adapted from DX4590-130 (Adkins impact summary chart).

2. Buffalo Hollow Crop Loss Info

345. There were no MRRP impacts on soy yield landward of the levee on the Buffalo Hollow property in 2007. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Buffalo Hollow Impact Summary Chart). There was a total production gain of 5 bushels of soy landward of the levee in 2007. *Id.* Soy impacts in 2007 riverward of the levee on the Buffalo Hollow representative property were only -1.57 bushels per acre. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Buffalo Hollow Impact Summary Chart). The total soy yield loss riverward of the levee in 2007 was -44 bushels. *Id.* Corn impacts in 2007 on the Buffalo Hollow representative property were -2.83 bushels per acre. Tr. 2475:2-10 (Evans); DX7007-178

adapted from DX4590-104 (Buffalo Hollow Impact Summary Chart). The total corn yield loss in 2007 was -1511 bushels. *Id.*

346. Soy impacts in 2008 landward of the levee on the Buffalo Hollow representative property were only -5.11 bushels per acre. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Annual and cumulative soy impacts landward of the levee on the Buffalo Hollow Property). The total soy yield loss landward of the levee in 2008 was only -907 bushels. *Id.* Soy impacts in 2008 riverward of the levee on the Buffalo Hollow representative property were only -11.43 bushels per acre. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Annual and cumulative soy yield impacts riverward of the levee on the Buffalo Hollow property). The total soy yield loss riverward of the levee in 2008 was only -323 bushels. *Id.* Corn impacts in 2008 on the Buffalo Hollow representative property were -40.73 bushels per acre. Tr. 2475:2-10 (Evans); DX7007-178 adapted from DX4590-104 (Annual and cumulative corn impacts on the Buffalo Hollow Property). The total corn yield loss in 2008 was -21,589 bushels. *Id.*

347. Soy impacts in 2010 landward of the levee on the Buffalo Hollow representative property were -26.95 bushels per acre. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Annual and cumulative soy impacts landward of the levee on the Buffalo Hollow Property). The total soy yield loss landward of the levee in 2010 was -4088 bushels. *Id.* Soy impacts in 2010 riverward of the levee on the Buffalo Hollow representative property were -12.94 bushels per acre. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Annual and cumulative soy yield impacts riverward of the levee on the Buffalo Hollow property). The total soy yield loss riverward of the levee in 2010 was only -366 bushels. *Id.* Corn yield impacts in 2010 on the Buffalo Hollow representative property were -95.67 bushels per acre. Tr. 2475:2-10 (Evans);

DX7007-178 adapted from DX4590-104 (Annual and cumulative corn impacts on the Buffalo Hollow Property). The total corn yield loss in 2010 was -51,203 bushels. *Id.*

348. There were no MRRP impacts on soy yield landward of the levee on the Buffalo Hollow property in 2013. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Annual and cumulative soy impacts landward of the levee on the Buffalo Hollow Property). Soy impacts in 2013 riverward of the levee on the Buffalo Hollow representative property were only -7.97 bushels per acre. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Annual and cumulative soy yield impacts riverward of the levee on the Buffalo Hollow property). The total soy yield loss riverward of the levee in 2013 was only -226 bushels. *Id.* Corn yield impacts in 2013 on the Buffalo Hollow representative property were practically non-existent at -0.01 bushels per acre. Tr. 2475:2-10 (Evans); DX7007-178 adapted from DX4590-104 (Annual and cumulative corn impacts on the Buffalo Hollow Property). Total corn yield loss on the Buffalo Hollow property in 2013 was a mere -4 bushels. *Id.*

349. There were no MRRP impacts on soy yield landward of the levee on the Buffalo Hollow property in 2014. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Annual and cumulative soy impacts landward of the levee on the Buffalo Hollow Property). There was a total production gain of 4 bushels of soy landward of the levee in 2014. *Id.* Soy impacts in 2014 riverward of the levee on the Buffalo Hollow representative property were only -2.61 bushels per acre. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Annual and cumulative soy yield impacts riverward of the levee on the Buffalo Hollow property). The total soy yield loss riverward of the levee in 2014 was -74 bushels. *Id.* Corn yield impacts in 2014 on the Buffalo Hollow representative property were practically non-existent at -0.01 bushels per acre. Tr. 2475:2-10 (Evans); DX7007-178 adapted from DX4590-104 (Annual and cumulative corn

impacts on the Buffalo Hollow Property). Total corn yield loss on the Buffalo Hollow Property in 2014 was a mere -6 bushels. *Id.*

350. For the Buffalo Hollow representative property, the cumulative predicted soybean yield impact landward of the levee from 2007-2014 is -4,986 bushels. Tr. 2474:6-18 (Evans); DX7007-176 adapted from DX4590-102 (Annual and cumulative soy impacts landward of the levee on the Buffalo Hollow Property). The cumulative soy yield impact riverward of the levee at the Buffalo Hollow representative property from 2007 to 2014 is -1033 bushels. Tr. 2475:20-25 (Evans); DX7007-177 adapted from DX4590-103 (Annual and cumulative soy yield impacts riverward of the levee on the Buffalo Hollow property). The cumulative corn yield impact r at the Buffalo Hollow representative property from 2007 to 2014 is -74,313 bushels. Tr. 2475:2-10 (Evans); DX7007-178 adapted from DX4590-104 (Annual and cumulative corn impacts on the Buffalo Hollow Property).

3. Ideker Crop Loss Info

351. Soy impacts in 2007 on the Ideker representative property were only -2.2 bushels per acre. Tr. 2459:7-14 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The total soy yield loss in 2007 was only -2,336 bushels. *Id.* Corn impacts in 2007 on the Ideker representative property landward of the levee were -29.6 bushels per acre. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The total corn yield loss for 2007 landward of the levee was -13,598 bushels. *Id.* Corn impacts in 2007 on the Ideker representative property riverward of the levee were -2.4 bushels per acre. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property). The total corn yield loss for 2007 landward of the levee was only -134 bushels. *Id.*

352. Soy impacts in 2008 on the Ideker representative property were only -6.6 bushels per acre. Tr.2459:7-14 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The total soy yield loss in 2008 was only -5,748 bushels. *Id.* Corn impacts in 2008 on the Ideker representative property landward of the levee were -5.7 bushels per acre. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The total corn yield loss landward of the levee for 2008 was only -3,655 bushels. *Id.* Corn impacts in 2008 on the Ideker representative property riverward of the levee were -1.6 bushels per acre. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property). The total corn yield loss for 2008 landward of the levee was only -92 bushels. *Id.*

353. Soy impacts in 2010 on the Ideker representative property were only -4.9 bushels per acre. Tr. 2459:7-14 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The total soy yield loss in 2010 was only -2,877 bushels. *Id.* Corn impacts in 2010 on the Ideker representative property landward of the levee were -10.8 bushels per acre. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The total corn yield loss for 2010 landward of the levee was only -7,222 bushels. *Id.* Corn impacts in 2010 on the Ideker representative property riverward of the levee were -0.2 bushels per acre. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property). The total corn yield loss for 2007 landward of the levee was only -11 bushels. *Id.*

354. Soy impacts in 2013 on the Ideker representative property were only -0.5 bushels per acre. Tr. 2459:7-14 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The total soy yield loss in 2013 was only -288 bushels. *Id.*

Corn impacts in 2013 on the Ideker representative property landward of the levee were -5.2 bushels per acre. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The total corn yield loss landward of the levee for 2013 was only -3,606 bushels. *Id.* Corn impacts in 2007 on the Ideker representative property riverward of the levee were -58.1 bushels per acre. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property). The total corn yield loss for 2007 landward of the levee was -3,234 bushels. *Id.*

355. Soy impacts in 2014 on the Ideker representative property were only -3.3 bushels per acre. Tr. 2459:7-14 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The total soy yield loss in 2014 was only -2,239 bushels. *Id.* Corn impacts in 2014 on the Ideker representative property landward of the levee were -11.3 bushels per acre. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The total corn yield loss landward of the levee for 2014 was only -5,394 bushels. *Id.* Corn impacts in 2014 on the Ideker representative property riverward of the levee were -6 bushels per acre. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property). The total corn yield loss for 2014 landward of the levee was only -333 bushels. *Id.*

356. For the Ideker representative property, "[t]he cumulative predicted soybean yield impact from 2007 through 2014 is [-]13,508 bushels." Tr. 2459:15-17 (Evans); DX7007-148 adapted from DX4590-78 (Annual and cumulative soy impacts at the Ideker property). The cumulative corn yield impact landward of the levee at the Ideker representative property from 2007 to 2014 is -34,369 bushels. Tr. 2460:2-9 (Evans); DX7007-149, adapted from DX4590-79 (Annual and cumulative corn impacts at the Ideker property). The cumulative corn yield impact riverward of

the levee at the Ideker representative property from 2007 to 2014 is -3,806 bushels. Tr. 2460:17-24 (Evans); DX7007-150, adapted from DX4590-80 (Annual and cumulative corn impacts riverward of the levee at the Ideker property).

F. Set-off Payments: Plaintiffs Received Hundreds of Thousands of Dollars from the Federal Government Through FEMA and USDA Crop Insurance and Disaster Assistance Payments

1. Federal Crop Insurance Payments

357. The FCIC insures or provides reinsurance for insurers or producers of agricultural commodities grown in the United States. Tr. 2655:20-2656:3 (Zanoni). The FCIC offers a catastrophic risk protection plan to indemnify producers for crop loss, loss of yield or prevented planting. *Id.* at Tr. 2656:8-13 (Zanoni). Approved Insurance Providers ("AIPs") are reinsured by the FCIC through RMA through a contract called the Standard Reinsurance Agreement which "establishes the terms under which FCIC provides reinsurance and subsidies on eligible crop insurance contracts sold by the insurance company." *Id.* at Tr. 2656:18-2657:8 and 2657:12-17 (Zanoni). Reinsurance is a risk-sharing mechanism where premiums and indemnities are shared between APIs and the government. Tr. 2659:18-2660:7 (Zanoni).

358. The Adkins & Sons Partnership made a crop insurance claim for loss of corn due to excess moisture on the representative property in 2007 and received a payment of $7,211 for 222 acres of corn. Tr. 2679: 7-14 (Zanoni); DX4564 (cause of loss key); DX4664 at 45-47 (Adkins PHI report 2000-2018). The Adkins & Sons Partnership made a crop insurance claim for loss of soy due to excess moisture on the representative property in 2007 and received a payment of $4,288 for 176.5 acres of soybeans. Tr. 2679:15-22 (Zanoni); DX5464 (cause of loss key); DX 4664 at 163 (Adkins PHI report 2000-2018). The total crop insurance payment for losses due to excess moisture on the Adkins & Sons Partnership representative property in 2007 was

$11,499.00. DX5464 (cause of loss key); DX4664 at 45-47 and 163 (Adkins PHI report 2000-2018).

359. The Adkins & Sons Partnership made crop insurance claims for a decline in corn price or harvest price below the projected price for crops grown on the representative property in 2008 and received a payment of $73,592 for 817.3 acres of corn. Tr. 2679:23-2680:2 (Zanoni); DX 4564 (cause of loss key); DX4664 at 51-53 (Adkins PHI report 2000-2018). The Adkins & Sons Partnership made crop insurance claims for hail damage to soybeans on the representative property in 2008 and received $117,893 for 254.4 acres. Tr. 2680:6-25 and 2681:10-20. (Zanoni); DX5464 (cause of loss key); DX4664 at 171-173 (Adkins PHI report 2000-2018). The total crop insurance payments for crops on the Adkins &Sons representative property in 2008 was $191,485.00. DX5464 (cause of loss key); DX4664 at 51-53 and171-173 (Adkins PHI report 2000-2018). None of the crop insurance claims made by the Adkins & Sons Partnership in 2008 were for flooding or excess moisture on the representative property. Tr. 2680: 3-5 (Zanoni); DX5464 (Cause of loss key); DX4664 at 51-53 and 171-173 (Adkins PHI report 2000-2018).

360. The Adkins & Sons Partnership made a crop insurance claim for loss of corn due to excess moisture on the representative property in 2010 and received a payment of $78,976 for 236.9 acres of corn. Tr. 2681: 21-25 (Zanoni); DX5464 (cause of loss key); DX4664 at 65 (Adkins PHI report 2000-2018). The Adkins & Sons Partnership did not make an insurance claim for loss of soy on the representative property in 2010. Tr. 2682:1-5 (Zanoni); DX5464 (cause of loss key); DX4664 at 183-188 (Adkins PHI report 2000-2018).

361. The total crop insurance payments Adkins & Sons partnership received for excess moisture or flooding on the representative property from 2007-2010 was $90,475.00. This does

not include payments made for hail damage and decline in price made in 2008. DX5464 (cause of loss key); DX4664 (Adkins PHI report 2000-2018).

362. Buffalo Hollow Farms Inc. made a claim for loss of corn due to excess moisture on the representative property in 2007 and received $698 for 21.5 acres. Tr. 2686:14-18 (Zanoni); DX5464 (cause of loss key); DX5155 at 21-23 (Buffalo Hollo PHI report 2000–2018). Buffalo Hollow Farms Inc. did not make a claim for loss of soybeans due to flooding or excess moisture on the representative property in 2007. Tr. 2686: 21 -2687:1 (Zanoni); DX5464 (cause of loss key); DX5155 at 101-104(Buffalo Hollo PHI report 2000–2018).

363. Buffalo Hollow Farms Inc. made a claim for loss of corn due to excess moisture on the representative property in 2008 and received $140,228 for 679.8 acres. Tr. 2687:2-6 (Zanoni); DX5464 (cause of loss key); DX5155 at 25-27 (Buffalo Hollo PHI report 2000–2018). Buffalo Hollow Farms Inc. made claims for loss of soy due to flooding and drought on the representative property in 2008 and received a total of $41,369 for 390.6 acres of which $4,297 was for flooding. Tr. 2687:7-21 (Zanoni); DX5464 (cause of loss key); DX5155 at 107-109 (Buffalo Hollo PHI report 2000–2018). The total crop insurance payment for losses due to flooding and excess moisture on the Buffalo Hollow Inc. representative property in 2008 was $144,525.00. DX4564 (cause of loss key); DX5155 at 25-27 and 107-109 (Buffalo Hollo PHI report 2000–2018).

364. Buffalo Hollow Farms Inc. made a claim for loss of corn due to flooding on the representative property in 2010 and received $280,318 for 690.2 acres. Tr. 2687:22-2688:1 (Zanoni); DX5464 (cause of loss key); DX5155 at 35-37 (Buffalo Hollo PHI report 2000–2018). Buffalo Hollow Farms Inc. made a claim for loss of soy due to excess moisture/flooding on the representative property in 2010 and received $58,988 for 279.5 acres. Tr. 2688:2-6 (Zanoni);

DX5464 (cause of loss key); DX5155 at 115-117 (Buffalo Hollo PHI report 2000–2018). The total cop insurance payment for losses due to flooding and excess moisture on the Buffalo Hollow Inc. representative property in 2010 was $339,306.00. DX5464 (cause of loss key); DX5155 at 35-37 and 115-117 (Buffalo Hollo PHI report 2000–2018).

365. Buffalo Hollow Farms Inc. did not make a claim for loss of corn on the representative property in 2013. DX5155 at 49-52. Buffalo Hollow Farms Inc. made claims for lost soy due to flooding on the representative property in 2013 and received a crop insurance payment of $730.00 for 18.9 acres. 3.9 acres for which an insurance payment of $151.00 was made may not be part of the representative property. Tr. 2688:7-17 (Zanoni); DX5464 (cause of loss key); DX5155 at 133 (Buffalo Hollo PHI report 2000–2018).

366. Buffalo Hollow Farms Inc. made claims for loss of corn due to excess moisture in 2014, but because there is no Land ID on the PHI form, it cannot be conclusively linked to the representative property. Buffalo Hollow Farms Inc. received and insurance payment of $2,088 for 56.5 acres. Tr. 2688:18-24 (Zanoni); DX5464 (cause of loss key); DX5155 at 53 (Buffalo Hollo PHI report 2000–2018). Buffalo Hollow Farms Inc. did not make a claim for lost soy due to excess moisture or flooding on the representative property in 2014. Tr. 2688:25-2689:5 (Zanoni); DX5464 (cause of loss key); DX5155 at 137-138 (Buffalo Hollo PHI report 2000–2018).

367. The total crop insurance payments Buffalo Hollow Farms Inc. received for excess moisture or flooding on the representative property from 2007-2014 was $485,259.00, excluding payments made for drought in 2008 and claims paid for flooding and excess moisture that couldn’t be positively linked to the representative parcel because the Land ID information was missing. DX5464 (cause of loss key); DX5155 (Buffalo Hollo PHI report 2000–2018).

368. Ideker Farms Inc. made a claim for loss of corn due to excess moisture on the representative property in 2007 and received $57,018 for 682.8 acres. Tr. 2683:11-15 (Zanoni); DX5464 (cause of loss key); DX4819 at 34 (Ideker PHI report 2000-2018). Ideker Farms Inc. made a claim for loss of soy due to excess moisture on the representative property in 2007 and received $2,527 for 104.1 acres. Tr. 2683:16-20 (Zanoni); DX5464 (cause of loss key); DX4819 at 107 (Ideker PHI report 2000-2018). The total crop insurance payment for losses due to excess moisture on the Ideker Farms Inc. representative property in 2007 was $59,545.00. DX5464 (cause of loss key); DX4819 at 34 and 107 (Ideker PHI report 2000-2018).

369. Ideker Farms Inc. made a claim for loss of corn due to excess moisture on the representative property in 2008 and received a payment of $162,963 for 742.1 acres. Tr. 2683: 21-25 (Zanoni); DX5464 (cause of loss key); DX4819 at 36-38 (Ideker PHI report 2000-2018). Ideker Farms Inc. made claims for loss of soy due to flooding, heat, and drought on the representative property in 2008 and received a payment of $27,471 for 867.9 acres of which $5,932 on 148 acres was for flooding. Tr. 2684:1:7 and 2685:3-7 (Zanoni); DX5464 (cause of loss key); DX4819 at 111-113 (Ideker PHI report 2000-2018). The total crop insurance payment for losses due to excess moisture on the Ideker Farms Inc. representative property in 2008 was $168,895.00. DX5464 (cause of loss key); DX4819 at 36-38 and 111-113 (Ideker PHI report 2000-2018).

370. Ideker Farms Inc. made an insurance claim for loss of corn due to flooding on the representative property in 2010 and received a crop insurance payment of $441,508 for 727.4 acres. Tr. 2685:8-13 (Zanoni); DX5464 (cause of loss key); DX4819 at 42-44 (Ideker PHI report 2000-2018). Ideker Farms Inc. made an insurance claim for loss of soy due to flooding on the representative property in 2010 and received a crop insurance payment of $231,808 on 589.2

acres. Tr. 2685: 14-18 (Zanoni); DX5464 (cause of loss key); DX4819 at 117 (Ideker PHI report 2000-2018). The total crop insurance payment for losses due to excess moisture on the Ideker Farms Inc. representative property in 2010 was $673,316.00. DX5464 (cause of loss key); DX4819 at 42-44 and 117(Ideker PHI report 2000-2018).

371. "Ideker Farms, Incorporated did not make a claim for either loss of corn or soybeans on the representative property in either 2013 or 2014." Tr. 2685:19-24 (Zanoni); DX4564 (cause of loss key); DX4819 at 58-64 and 127-132 (Ideker PHI report 2000-2018).

372. The total crop insurance payments Ideker Farms Inc. received for excess moisture or flooding on the representative property from 2007-2014 was $901,756.00. This does not include payments made for heat and drought in 2008. DX5464 (cause of loss key); DX4819 (Ideker PHI report 2000-2018).

2. USDA Supplemental Revenue Assistance Program (SURE)

373. The SURE Program was authorized by the 2008 Farm Bill. ECF No. 641 at 4 (Stipulation of Phase II Trial Testimony Regarding Certain USDA payments). SURE was first made available in 2010 and covered the 2008 through 2012 crop years. *Id.* The SURE Program was authorized by the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) to provide assistance to producers suffering crop losses due to natural disasters. *Id.* SURE was available for crop losses due to natural disasters occurring through September 30, 2011. *Id.* To receive SURE payments, an eligible producer must have a qualifying loss. *Id.* at 5. A qualifying loss means at least a ten percent production loss affecting one crop of economic significance due to a disaster on a farm in a disaster county. *Id.* Producers outside a declared disaster county, but with production losses greater than or equal to fifty percent of the normal production on the farm (expected revenue for all crops on the farm), also qualify for SURE. *Id.*

374. To be eligible for SURE, a producer must have obtained a policy or plan of insurance for all insurable crops on the farm through the Federal Crop Insurance Corporation and obtained Noninsured Crop Disaster Assistance Program ("NAP") coverage, if available, from the Farm Service Agency. *Id.* Persons or legal entities whose average nonfarm income exceeds $500,000 are not eligible for SURE payments. *Id.*

375. SURE payments are calculated based on sixty percent of the difference between the SURE Disaster Program Guarantee and the Total Farm Revenue. *Id.* at 6. The SURE Disaster Program Guarantee is determined by totaling the calculated guarantee for each crop on the producer's farm. *Id.* For insured crops, the guarantee is based on the level of insurance coverage the producer elected. Higher levels of coverage result in higher crop guarantees. *Id.* The farm's SURE guarantee cannot exceed ninety percent of the total expected revenue for the farm. *Id.* Sure Payments are limited to $100,000 per person and legal entity. Id.

376. Robert Adkins & Sons' Partnership participated in the USDA SURE program in 2010 and received a payment of $100,000.00. ECF No. 640 at 3; DX4687-0001 (Adkins 2010 SURE payment form).

377. Buffalo Hollow Farms Inc. participated in the USDA SURE program in 2010 and received a payment of $59,987. ECF No. 640 at 3; DX5381-0001 (Buffalo Hollow 2010 SURE payment form).

378. Ideker Farms Inc. participated in the USDA Supplemental Revenue and Assistance Program ("SURE") in 2008 and 2010 and received a payment of $100,000.00 each year. ECF No. 640 at 2; DX4811-0001 (Ideker 2008 SURE payment form); DX4812-0001 (Ideker 2010 SURE payment).

3. Flood Insurance Payments

379. The National Flood Insurance Program was established and authorized in 1968 to provide affordable flood insurance to the communities who join and participate in the National Flood Insurance program. Ph. I Tr.10668:4-24 (Rodriquez). Mr. Ideker admits that Ideker Farms, Inc. carried flood insurance on the farm manager's house and the river cabin. Tr. 287:14-17, 20-23 (Ideker Farms). In 2008, Ideker Farms filed a flood insurance claim and received a building claim payment of $5,842.79. Tr. 290:6-13 (Ideker Farms); *see also* DX4788. In 2010, Ideker Farms filed a flood insurance claim and received a building claim payment of $13,235.57. Tr. 288:19-289:10 (Ideker Farms); *see also* DX4788. The insurance company, American Bankers Insurance Company provided a building valuation that determined the estimated actual cash value of the river cabin to be $85,968.61. Tr. 289:11-23 (Ideker Farms).

G. Plaintiffs' Prejudgment Interest Rate Calculations Do Not Make Sense

380. Dr. Sunding explained in his testimony why Dr. Bateman's proposed interest rate is improper. Tr. 2839:21-2844:7 (Sunding). Specifically, Dr. Sunding explained that Dr. Bateman's proposed interest rate is inappropriate because it would reward the Plaintiffs with an inflated rate of return that reflects investment risk, even though Plaintiffs never actually assumed any investment risk: "The conversion of past losses into current period damages doesn't require the Plaintiffs to take on any additional risk and thus, it is inappropriate as a matter of economics to use a rate of return on risky assets to make that conversion." Tr. 2843:4-9 (Sunding).

381. Dr. Sunding explained that from an economics perspective, the proper interest rate to apply is the yield on one-year Treasury bonds (the "T-bond rate"). Tr. 2843:16-2844:3 (Sunding). "My opinion is that if the Court finds that the Plaintiffs are entitled to prejudgment interest, then the Court should use a risk-free rate of return." Tr. 2842:12-15 (Sunding). Dr. Sunding provided a chart summarizing the correct T-bond interest rate for each year at issue in

this case 2007-2020, and the annual compounded rate for each year as well. DX6033-0024 (chart of one-year T-bond rates); Tr. 2843:16-2844:3 (Sunding).

382. Dr. Sunding also explained that Dr. Bateman incorrectly calculated *quarterly* compounding for an *annualized* rate of return. Tr. 2841:19-22 (Sunding) (emphasis added). This mistake further inflated Dr. Bateman's incorrectly calculated rate of return by approximately 0.5-0.9%. Tr. 2841:17-25 (Sunding).

PROPOSED CONCLUSIONS OF LAW

X. *Arkansas Game & Fish* Applies in Determining Whether Intermittent Flooding Due To Government Action Constitutes a Taking Regardless of Whether the Government Action is Bounded in Time

383. In *Arkansas Game & Fish Commission v. United States ("Ark. Game & Fish I")*, 568 U.S. 23 (2012), the Supreme Court made clear that to determine whether intermittent flooding due to government action constitutes "'physically tak[ing] possession of an interest in property,'" courts must apply a multi-factor, "situation-specific factual inquiry." *Id.* at 31–32 (quoting *Tahoe–Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 322 (2002)).

384. The Supreme Court identified two "bright line[]" scenarios that do not require such an analysis: "permanent physical occupation of property" and "regulation that permanently requires a property owner to sacrifices all economically beneficial uses of his or her land." *Id.* (citing *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 426 (1982), and *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1019 (1992)). Land subject to intermittent flooding is neither permanently occupied nor (necessarily) made economically obsolete. Further, the Court in *Arkansas Game* cited *Ridge Line v. United States*, 346 F.3d 1346 (Fed. Cir. 2003), in its discussion of the multi-factor, fact-specific inquiry to be undertaken in determining the existence of a taking. *See id.* at 39.

385. Subsequent decisions within the Court of Federal Claims comport with the understanding that the fact-specific, multi-factor inquiry outlined in *Arkansas Game* applies in cases where landowners have alleged that the United States has taken a permanent easement to flood property. *See In re Upstream Addicks and Barker (Texas) Flood-Control Reservoirs*, 146 Fed. Cl. 219, 247–48 (2019) (stating that the multi-factor test "subsum[es] the considerations of the *Ridge Line* test"); *Orr v. United States*, 145 Fed. Cl. 140, 149 (2019).

XI. Plaintiffs' Claims Fail Because Plaintiffs Failed to Present Any Evidence of the Additional Incremental Flooding Between the Actual and But-For Worlds

386. The Court decided in Phase I that the Corps' actions under the MRRP caused "higher WSEs" in the Missouri river, leading in turn "to flooding, or more severe flooding on the propert[ies] . . . than the flooding the plaintiff[s] would have experienced" absent the Corps' actions under the MRRP. *Ideker*, 136 Fed. Cl. at 674.

387. The Court did *not* decide "the full extent of the injury to [the Plaintiffs'] property interests." *Id.* at 678–70. Instead, it left "[is]ssues regarding the full extent of the injury and of valuing the interest taken" for Phase II. *Id.* at 678–79; *see also id* at 699 n.50 (stating that "[t]he plaintiffs at this stage of the litigation were not required to quantify the precise damage to their properties").

388. The factual record in this case makes clear that to the extent the Corps' actions caused some flooding in certain years, the Corps' actions did not cause all of the flooding. *See generally* Section V.B *supra*. Indeed, all the evidence shows that the Corps caused only some incremental amount of additional flooding in certain years.

389. Whether, and more importantly to what extent, the incremental impacts of the flooding actually experienced differed from the impacts of flooding that would have been experienced is critical not only to liability questions of whether expectations were frustrated and the severity of

any impact, but also to the just compensation determination of the limited effect of incremental flooding on market value. *See infra* §§ XI–XII, XVI.

390. Plaintiffs failed, however, to provide any trial evidence of the incremental amount of flooding they contend the Corps' actions caused beyond the but-for flooding that would have occurred without the Corps' actions. Indeed, Plaintiffs even admitted in pretrial filings that Plaintiffs chose not to develop expert testimony of the incremental amount of additional flooding. *See* ECF No. 595 at 28 and 39 (Plaintiffs admitting they have no experts who can compare how the effects of actual and but-for flooding might compare).

391. At the close of Plaintiffs' case, the United States made a Rule 52 motion for judgment, based on Plaintiffs' failure to meet their burden to provide any evidence on the purported level incremental flooding. Tr. 1233-38. The United States renews that motion here.

392. In its own case, the United States provided the only evidence in the case on the level of additional incremental flooding. *See supra* Section IX.E.

393. Because Plaintiffs failed to present any evidence of the amount of incremental flooding, Plaintiffs failed prove either liability or just compensation for their claims. If this Court makes findings on any particular measure of incremental flooding, despite Plaintiffs' failure of proof, the only available evidence is what the United States presented. If a finding is not supported by substantial evidence, it will be found to be clearly erroneous on appeal. *See* FEDERAL PRACTICE AND PROCEDURE (WRIGHT & MILLER, 3RD ED.), Ch. 7, Trials, §2585 (2020). *See also Kontonotas v. Hygrosol Pharm. Corp.*, 424 Fed. App'x 184 (3d Cir. 2011) (citation omitted) (factual determinations do not meet clear error standard when either "(1) 'completely devoid of minimum evidentiary support displaying some hue of credibility,' or (2) 'bear[] no rational relationship to the supportive evidentiary data'").

XII. Plaintiffs' Claims Fail Because the Character of Plaintiffs' Land Has Not Meaningfully Changed as a Result of the Corps' Actions

394. The "character of the land" is the third relevant factor to the takings inquiry. *Ark. Game & Fish Comm'n*, 568 U.S. at 39. This factor is comparable to the traditional "character of the governmental action" factor in the *Penn Central* balancing test for flood cases. *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978). The Court must evaluate the history, location and characteristics of the Plaintiff's properties in order to determine whether the United States has significantly altered the nature and extent of flooding at the properties. *See United States v. Sponenbarger*, 308 U.S. 256, 265 (1939). "*Arkansas Game*, by contrast, points courts to determine whether a taking (as opposed to a tort) occurred by looking at the nature of the underlying land, i.e., was it prone to repeated flooding or especially susceptible to flooding." *Caquelin v. United States* ("*Caquelin III*"), 140 Fed. Cl. 564, 581 (Ct. Cl. 2018), a*ff'd*, 959 F.3d 1360 (Fed. Cir. 2020).[27]

395. In this case, Plaintiffs' properties are located next to the Missouri River and have been subject to flooding (and, at times, major flooding) at unpredictable intervals throughout recorded history. In addition to major floods, properties along the Missouri River have also been subject to

[27] And as the Federal Circuit noted on remand in *Arkansas Game*, "the proper comparison" was between the flooding that occurred as a result of the deviations and the flooding that occurred under pre-dam conditions, although the difference was immaterial in that case because the increased flooding was even greater compared to pre-dam conditions than compared to the post-dam, pre-deviation conditions. *Ark. Game & Fish Comm'n v. United States ("Ark. Game & Fish Comm'n II")*, 736 F.3d 1364, 1372 n.2 (Fed. Cir. 2013). That is manifestly not so in this case, where there is no dispute that the representative properties were subjected to greater flooding under pre-dam conditions. *See e.g.* Pls.' Resp. to U.S. Mot. for Recons., ECF No. 440 at 21, (wherein Plaintiffs stated ". . . it would be impossible for a situation to arise where the risk of flooding would be ever greater after the construction of the System dams, the BSNP, and the federal levees due to subsequent flood risk-increasing government actions but for their construction or to show that the flooding would have not have been as great but for the Corps' implementation of the MRRP, even if the dams, BSNP, and levees had not been constructed.").

many more localized, floods of varying severity. Tr. 1256:12-25 (Kelman); Tr. 1266:5-10 (Kelman). Even after construction of the Federal dams and system of levees, flooding continued in the areas near the Plaintiffs' properties throughout the 1960's. Tr. 1287:25-1289:13 (Kelman); DX5730; DX5744 (1971 notice of public meeting which warned that flooding was inevitable, and referenced floods in 1962, 1964, 1965, and 1967). In 1969, a magazine for landowners along the river warned that the problem of Missouri River flooding might be impossible to solve. Tr. 1290:4-9 (Kelman); DX5735. *See also supra* § VII.C.

396. Though Plaintiffs' testimony about prior flooding has varied and their recollection of floods is certainly incomplete, Plaintiffs themselves reported that their properties were subject to flooding. *See* USA's Phase I Post Tr. Br. Table 10 (listing how Plaintiffs' reporting of past flooding varied over time). At minimum, Adkins recalled prior flooding in 1967, 1984, 1993, and 1995, Tr. 56:14-58:5 (Adkins). The Partnership admits seepage may have occurred in other years he does not recall. Adkins Partnership Phase II Depo. Tr. 200:10-201:17. At minimum, Ideker recalled flooding in 1952, prior to acquisition by the Ideker family; 1962 and 1967, all prior to the dams becoming operational; and then in 1984 and 1993. Ph. I Tr. 5421: 11-14 (Hromadka). Ideker Farms admits flooding, or instances when water prevented crops from being planted, might have occurred in years the owners do not recall. Tr. 224:17-20 (Ideker); Ideker Farms Phase II Depo. Tr. 67:16-22; 68:11-20; 126:18-128:15. At minimum, Schneider reported flooding on the Buffalo Hollow farm in 1952, 1967, 1973, 1984, and 1993. Ph. I Tr.146:22-147:4 (Schneider). Buffalo Hollow admits flooding might have occurred in years the owners do not recall, and that some flooding did occur that did not have an impact on crops. Buffalo Hollow Phase II Depo. Tr. 123:11-18; 123:24-124:6; 124:25-126:7.

397. All three properties lie within FEMA designated flood hazard zones; Ideker and Adkins lie within the FEMA designated AE Floodway while Buffalo Hollow lies in Flood Zone A. Joint Stip. of Fact, ECF No. 187, Ex. 1 at 15, 16, and 17; Tr. 1973:1–4, 14–16, 1974:24–1975:4 (Jones). The AE Floodway is an area in which FEMA regulations prohibit encroachment, or development. Tr. Ph. I Tr: 10683:2–10684:6 (Rodriguez). Flood zone A is a special flood hazard area. Ph. I Tr: 10693:24–10694:3 (Rodriguez).

398. Given the properties' natural tendency to flood (especially in areas outside of the levees), Federal and State government entities have long encouraged residents to purchase flood insurance and prepare for possible flooding. *See e.g.*, Ph. I Tr: 10668: 4-24 (Rodriguez). The USDA administers Federal crop insurance programs, and has maintained data related to crop yield and insurance claims since the early 1990's. Tr. 2658: 21–2659: 7 (Zanoni). In the years prior to 2004, Adkins had crop losses due to excess moisture in 1992, 1993, 1995, 1998, 1999, 2001, and 2003;[28] Ideker had crop losses due to excess moisture in 1996, 1997, 1998, 1999, and 2001;[29] and Buffalo Hollow had crop losses due to excess moisture in 1993, 1995, and 1999.[30]

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[28] Tr. 2662: 4-6 (Zanoni); DX4181 at 3 (Adkins PHI 1992 -1999); Tr. 2662:25-2663:5 (Zanoni); DX4181 at 69 and 71-73 (Adkins PHI 1992 -1999); Tr. 2663:10-17 (Zanoni); DX4181 at 25 and 27 (Adkins PHI 1992 -1999); Tr. 2663:18–2664:5 (Zanoni); DX4181 at 41-44 and 101-103 (Adkins PHI 1992 -1999); Tr. 2664:6-17 (Zanoni); DX4181 at 49-51 and 109 (Adkins PHI 1992 -1999); Tr. 2664:24–2665: 6 (Zanoni); DX4664 at 21-23(Adkins PHI 2000-2018).

[29] Tr. 2666: 17–2667:9 (Zanoni); DX4672-3 and 15 (Ideker PHI 1995-1999); Tr. 2667:10-18 (Zanoni); DX4672 at 5 and 19 (Ideker PHI 1995-1999); Tr. 2667:19-22 (Zanoni); DX4672 at 7 (Ideker PHI 1995-1999); Tr. 2667:23–2668:11 (Zanoni); DX4672 at 9-11 and 23 (Ideker PHI 1995-1999); Tr. 2668:12-16 (Zanoni); DX4891 at 4 (Ideker PHI 2000-2018).

[30] Tr. 2669: 9-14 (Zanoni); DX4670 at 29 (Buffalo Hollow PHI 1989-1999); Tr 2669:15-21 (Zanoni); DX4670 at 11-13 (Buffalo Hollow PHI 1989-1999); Tr. 2669:22-2670:2 (Zanoni); DX4670 at 43 (Buffalo Hollow PHI 1989-1999).

399. Despite claims that flooding damaged crops on their farms, contemporaneous records reveal that the amount of crops lost to flooding was often low, with the yields on the remaining land similar, or even higher, than yields expected during non-flood years. For example, Ideker's estimated crop loss percentage was two percent in 2013 and 2015, and zero percent in 2014. Tr. 277:10-12, 18; 277:19-22; 278:4-7 (Ideker); *see also* DX4786. Ideker's average yields for corn in 2013 and 2014 were higher than the average corn yields in 2004, 2005, 2006, and 2009 when no flooding occurred on the property. Tr. 280:16-281:16; 279:17-25 (Ideker). Average corn yields at Buffalo Hollow for 2013 were higher than average yields in non-flood years from 2000 to 2018 except for 2003 and 2009. Tr. 193:5-14; 194:14-195:2; 196:2-7; DX5318; DX5110. Average corn yields for Buffalo Hollow in 2016 and 2017 (claimed "flood" years) were higher than average yields in non-flood years of 2000-2003. Tr. 196:2-19 (Buffalo Hollow).

400. As the Court has previously recognized, many of the Plaintiffs' properties were created by accretion. Trial Opinion at 11-12. The Missouri River, in its unregulated state, was not stable but shifted location by as much as a mile or more at frequent intervals. DX5685 at 3; Tr. 1277:10-20 (Kelman). All three of the Phase II Plaintiffs own land that was created through accretion, and only remains in existence as a result of the Corps continued operation of the BSNP. This accreted land, comprised of river-sediment deposits, and land overlying historic river channels is composed of highly permeable soils that are naturally prone to seepage. Ph. I Tr. 8000:14-8001:3, 8002:10-8004:7 (Remus); Ph. I Tr. 12350:15-12351:1 (Schaefer), DX1122.

401. Historic Missouri River Commission maps show that the Missouri River ran straight through the middle of the Ideker property in the 1890's, and that the current Ideker property was largely formed by accretion by 1945. Ph. I Tr. 8009:21 - 8010:6 (Remus); DX 1122-0012 & -0013. Historic aerial photographs show that the entire northern half of the Buffalo Hollow Farms

property was part of the Missouri River in 1930 and was later formed by accretion. Ph. I Tr. 8007:8-21 (Remus); DX1122-0007 & -0008. Historic aerial photographs show that the southwest corner of the Adkins property was part of the Missouri River in 1930 and was later formed by accretion. Ph. I Tr. 8014:19–8015:1, 8015:15-17 (Remus); DX1122-0023 & -0024.

402. Plaintiffs have failed to prove entitlement to unaltered river flows in view of the legal rights of other riparian owners, including the Federal government. In fact, Plaintiffs cannot have a property interest in unaltered flows as a matter of Federal law because the legislation authorizing construction of the dams required the government to operate the dams to maximize the benefits of eight authorized purposes. The Corps of Engineers Master Manual for the Dams has always contemplated that the operation of the dams can change through revisions to the Master Manual to meet changing circumstance over time and also includes provisions for temporary deviations in the flow regime below the dams. Plaintiffs simply do not have a valid property interest in the United States providing a certain level of flood protection. *Nicholson v. United States*, 77 Fed. Cl. 605, 624, (2007) (quoting *Sponenbarger*, 308 U.S. at 266).

403. The laws of Iowa,[31] Missouri,[32] and Kansas[33] reflect the inherent hazards of property ownership in a floodplain, and the nature of riparian land rights under State law is qualified does not give a riparian land owner the right to insist that those upstream never take any action that

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[31] *Gehlen v. Knorr*, 101 Iowa 700 (1897); *Eaves v. City of Ottumwa*, 240 Iowa 956 (1949); *Iowa Nat. Res. Council v. Van Zee*, 261 Iowa 1287 (1968).

[32] *Kueffer v. Brown*, 879 S.W.2d 658 (Mo. Ct. App. 1994); *Robinson v. Missouri State Highway and Transp. Comm'n*, 24 S.W.3d 67 (Mo. Ct. App. 2000); *Bettinger v. City of Springfield*, 158 S.W. 3d 814 (Mo. Ct. App. 2005).

[33] *Atchison, T. & S.F. Ry. Co. v. Shriver*, 101 Kan. 257 (1917); *Williams v. City of Wichita, 190 Kan*. 317 (1962); *Johnson v. Bd. of Cnty. Comm'rs of Pratt Cnty*, 259 Kan. 305 (1996); *Dougan v. Rossville Drainage Dist.*, 270 Kan. 468 (2000); *Isnard v. City of Coffeyville*, 260 Kan. 2 (1996); *Acker v. Burlington Northern & Santa Fe Ry. Co.*, 388 F. Supp. 2d 1299 (2005).

will increase or decrease the volume of water flowing downstream at any particular point in time. Indeed, the law is exactly the opposite: that those owning land along a river must anticipate that other landowners will make reasonable use of their properties and the benefits and burdens of riparian ownership will be shared with their neighbors.

404. The location of Plaintiffs' properties adjacent to the Missouri River has resulted in a long history of flooding. However, it is precisely this location that makes the properties so nutrient-rich and productive for agricultural use. The flooding that occurred between 2007 and 2014 did not significantly alter the character of the land for its intended agricultural purpose. On the contrary, the flooding that occurred was consistent with the historical record, and landowners had ample warning of the potential for floodwaters to inundate their land.

405. Plaintiffs will likely argue that flooding at the properties between 2015 and 2018 is evidence of an altered pattern of flooding at the properties. Plaintiffs, however, have not adduced competent evidence that could show that the United States caused flooding experienced in those years under the standard the Court laid out in Phase I. *See Ideker Farms*, 136 Fed. Cl. at 674.

406. In the Phase I Opinion, the Court made clear that to show causation, Plaintiffs had to demonstrate "that: (1) the Corps' System and River Changes were made for a single purpose; (2) the cumulative and combined effects of the System and River Changes made for that single purpose led to higher WSEs than would have existed without the System and River Changes; and (3) the higher WSEs led to flooding, or more severe flooding on the property owned or farmed by that individual plaintiff than the flooding the plaintiff would have experienced without the Corps' System and River Changes." *Id.* The mere fact that flooding occurred at a property in a given year is not enough to meet this standard. *See id.* at 730–31 (no causation at the Adkins property in 2013 or 2014 even though flooding occurred).

407. Plaintiffs' expert hydrologist, Dr. Mays, admitted that he did not analyze the effect of System Changes on river WSEs in any year from 2015 to 2018. Tr. 937:1–938:4 (Mays). Nor did he model what WSEs at the representative properties were in any of those years, or what WSEs at the representative properties would have been in any of those years but-for the Corps' actions under the MRRP. Tr. 938:13–21 (Mays).

408. Without any proof of causation, the Court cannot base a determination about a flooding pattern *caused by the MRRP* on the representative Plaintiffs' experiences in those years, any more than it could base such a determination on the flooding at the Adkins property in 2013 and 2014.

XIII. Plaintiffs' Claims Fail Because Plaintiffs' Reasonable Investment-Backed Expectations in their Land Have Not Been Meaningfully Restricted By the Corps' Actions

A. Legal Standard

409. The Supreme Court has held that when "temporary physical invasion by government [action] interferes with private property,". . . "the owner's 'reasonable investment-backed expectations' regarding the land's use" are "a factor in determining the existence *vel non* of a compensable taking." *Ark. Game & Fish Comm'n I*, 568 U.S. at 38-39. An objective standard applies. *See Ruckelshaus v. Monsanto Co.*, 467 U.S. 986, 1005-06 (1984) (explaining that "a reasonable investment-backed expectation must be more than a unilateral expectation or an abstract need"); *Chancellor Manor v. United States*, 331 F.3d 891, 907 (Fed. Cir. 2003) (requiring an "objective analysis to determine the reasonable investment-backed expectations"). The "burden is on the owners to establish a reasonable investment-backed expectation in the property at the time it made the investment." *Cienega Gardens v. United States*, 503 F.3d 1266, 1288 (Fed. Cir. 2007) (citing *Forest Props., Inc. v. United States*, 177 F.3d 1360, 1367 (Fed. Cir. 1999)). The Federal Circuit treats the absence of reasonable investment-backed expectations as

dispositive of a plaintiff's takings claim, "limit[ing] recovery to owners who can demonstrate that they bought their property in reliance" on non-interference by the government. *Creppel v. United States*, 41 F.3d 627, 632 (Fed. Cir. 1994); *see also Love Terminal Partners v. United States*, 889 F.3d 1331, 1346 (Fed. Cir. 2018), *cert. denied*, 139 S. Ct. 2744 (2019); *Good v. United States*, 189 F.3d 1355, 1363 (Fed. Cir. 1999). The analysis typically assesses whether a plaintiff has expectations; whether those expectations were backed by investment; whether those expectations were reasonable; and whether the plaintiff made the investment because of its reasonable expectation of receiving the benefits allegedly denied or restricted by the government action. *See Cienega Gardens*, 503 F.3d at 1288-89.

B. Law Applied to the Facts of this Case

410. As applied to the facts of this case, it is clear that Plaintiffs have not carried their burden of proving these facts. Plaintiffs have offered witness testimony, without corroborating evidence, that they or their predecessors originally acquired the representative properties, invested in farming equipment to, and have invested in irrigation, drainage, and flood protection features over time. *See infra* Part VII; Tr. 222-7-10 (Ideker), Tr. 225:10-15 (Ideker), Tr. 225:21-24 (Ideker), Tr. 227:16-19 (Ideker), Tr. 228:3-7 (Ideker). But it is not clear from that testimony what specific expectations Plaintiffs had about Government actions, or whether the investments were actually made based on those expectations. And because the Government has shown that Plaintiffs' land has always been subject to flooding, any investment-backed expectations were not interfered with by Government actions.

1. Plaintiffs Have Failed to Prove that they Made Investments Based on Expectations about the Corps' Pre-2004 Operations

411. While Plaintiffs may have made investments in the representative properties based in part upon the existence of the Mainstem System and BSNP, they have not shown that they had

expectations that the Corps would operate in perpetuity under the 1979 Manual, that they made investments based on those expectations, or that such expectations, if they existed at all, were reasonable. Thus, they have failed to carry their burden of proof as to this factor.

412. Mr. Ideker testified generally that he relied upon the Government's publications and representations that flooding would be substantially reduced by completing the dams and stabilizing banks. Tr. 222:14-19 (Ideker). But the Government *has* built the dams and completed the BSNP, and both remain in place today.[34] Mr. Ideker did not testify that he made investments based on specific knowledge about Corps activities or that the 2004-06 changes disrupted such expectations. Moreover, at the time the property was transferred to Ideker Farms Inc., in 1972, the 1979 Master Manual had not yet been written, it could not have been relied on; and as Mr. Ideker testified, "the family paid nothing or very little for the transaction," and Ideker Farms, Inc. would have acquired the land even if it were known that the land would continue to flood. 01/29/2020 Dep. Tr. 86:5-15 (Ideker Farms). Ideker Farms "did not really have any thoughts" as to whether the Corps' structures would provide the same flood protection into the future, and did not investigate that question. *Id.* at 103:24-104:7. Given that testimony, Mr. Ideker has not shown that he or Ideker Farms Inc. had reasonable investment-backed expectations that about Corps flood protection efforts that could have been disrupted by the System and River Changes the Corps made in 2004-06.

413. Plaintiffs have also failed to prove that the incremental flooding actually caused by the MRRP changes disrupted their investment-backed expectations. Even assuming that the MRRP

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[34] To the extent Mr. Ideker or other Plaintiffs relied on the expectation that the Corps would eventually construct parts of the Pick-Sloan plan that were never actually constructed, those expectations clearly cannot have been reasonable. *See infra* Section VI. (discussing fact that comprehensive Pick-Sloan plan was never fully constructed as originally envisioned).

did cause more frequent and severe flooding than would have occurred, Plaintiffs' Phase II evidence appears to rely on the false premise that *all* flooding in the years at issue was attributable to the Corps' MRRP actions. That is clearly not the case, and is at odds with Plaintiffs' expert testimony and this Court's findings after Phase I. Because Plaintiffs have failed to present credible evidence of the extent to which the MRRP changes increased flooding on their properties, they have also failed to show how that incremental flooding interfered with any reasonable investment-backed expectations.

414. Additionally, Plaintiffs have failed to allege, much less to prove, that they have a property interest under state law to be free of MRRP flooding. *Cf. Ark. Game & Fish Comm'n II*, 736 F.3d at 1375 (noting, but declining to address because they were not previously raised before the Court of Federal Claims, the government's arguments "that because the Commission did not purchase the Management Area property until after the Clearwater Dam was built and the Manual went into effect, the Commission's property interest is necessarily qualified by the right of the Corps of Engineers to authorize deviations from the ordinary flowage rates at any time," and "that under Arkansas water rights law the Commission has no legal right against flooding by an upstream property owner or operator."). As discussed *infra,* Part VIII (Character of the Land), the inherent hazards of property ownership in a floodplain and the qualified nature of riparian land rights under State law preclude any reasonable expectation that Plaintiffs could expect to be protected by the Corps' action from flooding on their land. *Cf. Ark. Game & Fish Comm'n II*, 736 F.3d at 1375 (noting, but declining to address because they were not previously raised before the Court of Federal Claims, the government's arguments "that because the Commission did not purchase the Management Area property until after the Clearwater Dam was built and the Manual went into effect, the Commission's property interest is necessarily qualified by the right

of the Corps of Engineers to authorize deviations from the ordinary flowage rates at any time," and "that under Arkansas water rights law the Commission has no legal right against flooding by an upstream property owner or operator.").

2. The United States' Evidence Clearly Shows that Any Investment-Backed Expectations to be Free of Flooding Would Not Have Been Reasonable

415. The United States' evidence clearly shows that a property owner in the region where the representative properties are located could not reasonably have expected that the Corps' operation of the Missouri River Mainstem System and BSNP, under the 1979 Manual or any other manual, would have prevented all flooding. To the contrary, a reasonable property owner would have known, and the representative property owners *did* know, that such property was subject to continuing flood risk, and to continued, occasional flooding. Nor could a property owner reasonably have expected the Corps to continue its pre-2004 operation and maintenance of the Mainstem System and BSNP without change, when the Corps had changed its operations in the past. As discussed *infra*, Part VII, Plaintiffs' land was subject to flooding before and after Mainstem System, and before and after 2004-2006 changes. The Master Manual has always contemplated that the operation of the dams can change through revisions to the Master Manual to meet changing circumstance over time, has included provisions for temporary deviations in the flow regime below the dams, and the Corps did in fact change the Master Manual prior to 2004

3. Anticipated Arguments by Plaintiffs

416. The United States anticipates that Plaintiffs will try to argue, as they did in their motion in limine to exclude the Government's expert testimony on this factor, ECF No. 589, that reasonable investment-backed expectations are tied to causation, and to the subjective opinions of Plaintiffs. They have argued that "[t]the Plaintiffs' RIBEF—"reasonable investment-backed

expectations of flooding"—"are not the proper subject matter for expert testimony," and that this Court's finding that the MRRP has caused more frequent and severe flooding proves that such flooding was "unexpected," and, therefore, must have interfered with investment-backed expectations. ECF No. 589 at 5-6, 15-16. As discussed below and separately in the United States' Opposition to Plaintiffs' Motion in Limine (ECF No. 589), that is not the legal standard.

417. Plaintiffs have also argued that this Court cannot take into account flooding that actually occurred before the construction of the Mainstem System, or flooding that would have occurred in a different "but-for world" than what the Court considered for causation in Phase I. ECF No. 589 at 18. This too has no foundation in law, and the Court rightly rejected this argument ECF No. 627 at 3, *citing Ideker Farms*, 136 Fed. Cl. at 734 n.81 ("[A]ny history of flooding . . . will be considered in Phase II of this litigation which includes consideration of the character of the land at issue and reasonable investment-backed expectations."). The United States has shown that each of the representative properties was prone to flooding before the Corps carried out the 2004-2006 changes. *See infra* Part VII.

418. Finally, Plaintiffs may argue that a reasonable landowner would have expected that the Corps would continue prioritizing flood control and reducing flood risk to the same extent as prescribed by the 1979 Manual.

4. Plaintiffs' Anticipated Arguments Are Wrong

419. Plaintiffs' anticipated arguments do not fit the applicable law. Determining reasonable investment backed expectations is a legal inquiry that is not dependent on the subjective views of individual plaintiffs. *Ruckelshaus*, 467 U.S. at 1005-06; *Chancellor Manor*, 331 F.3d at 907. The determination is also not synonymous with the causation inquiry, as Plaintiffs assert in their motion in limine, ECF No. 589 at 18-19; if it were, RIBE would cease to be a factor at all, because there can be no viable takings claim without causation. Thus it is insufficient for

Plaintiffs to reason in a circle that because the MRRP has caused flooding, the MRRP has interfered with RIBE that such MRRP-caused flooding would not occur. The question, rather, is whether the Government action that caused the flooding has interfered with reasonable investment-backed expectations; that is a legal question, dependent upon consideration of complex facts and law, and it is appropriate to consider expert testimony in making that determination.

420. In determining RIBE, courts naturally must consider what was expected, and what happened. But that does not mean, as Plaintiffs assert, that this Court can disregard evidence of flooding that occurred in the past, since such flooding would necessarily have informed a reasonable investor's expectations about what flooding might be expected to occur in the future. Moreover, the United States' evidence about past flooding is not limited to the important fact that flooding did occur on the representative properties before and after the Mainstem System was constructed, and before and after the 2004-2006 MRRP changes; additionally, the United States has presented expert testimony about the *effects* of that flooding on the productivity of the land, and land values. That evidence demonstrates that the productivity of the land and the value of the land—factors that would be central to any reasonable investment backed expectations—has not changed considerably as a result of the MRRP changes.

421. To the extent Plaintiffs did invest based on such expectations, Plaintiffs have not shown that those expectations were reasonable. The fact that the properties did in fact flood repeatedly prior to 2004 shows that any such expectation would have been objectively unreasonable. Nor can Plaintiffs have had a reasonable expectation that the Corps would continue operations under the 1979 Manual. Before 1979, of course, the Corps did not operate under the 1979 Manual, and the Corps changed its operating manuals several times before that. *See supra* § VII.B. More

broadly, Plaintiffs cannot have had reasonable investment-backed expectations that the Corps would continue to operate and maintain the Mainstem System in perpetuity, at consistent levels of funding. *Cf. Ideker Farms*, 136 Fed. Cl. at 668 (citing changes in federal spending as evidence of changing priorities).

422. Nor could Plaintiffs have reasonably expected the Corps to ignore or violate Federal law, including but not limited to the Water Resources Development Act of 1986, which authorized and directed the Corps *in 1986* "to complete projects to mitigate BSNP habitat losses by returning the River to a more natural state," *id.* at 665, and the Endangered Species Act of 1973, which caused the Corps to "commence[] a review of the 1979 Master Manual *in 1989* as part of its [ESA] obligations to address the *changes that could be made to the System's operation* to ameliorate some of the damage caused to the Missouri River Basin ecosystem, in particular in terms of threatened and endangered species," *Id.* (emphasis added). Those Federal laws, and the possibility that they would require changes of the nature that were in fact carried out several decades later, were publicly available, and widely known (and controversial) within the Missouri River Basin. Plaintiffs have not claimed that they or other reasonable landowners in the region were ignorant of these laws, but even if they had, investment-backed expectations cannot be reasonable to the extent that they rely on Government-provided gratuities, or, surely, violations by the Government of applicable laws.

XIV. Plaintiffs' Claims Fail Because Any Additional Incremental Flooding Faced by Plaintiffs Lacks Severity

423. The United States argued after Phase I that full adjudication on the severity factor was premature. *See* United States' Post Trial Br. at 80–81, ECF No. 375; *see also* United States' Response to Pls.' Notice re: the Date of Taking at 7–8 n.7, ECF No. 518. And in the Phase I opinion, the Court appeared to have, at most, made a partial determination on severity. *See*

Ideker Farms, 136 F3d. Cl. at 678–80. However, before the Phase II trial, the Court determined that the three Phase II representative Plaintiffs had fully proven severity in Phase I. See Order on Gov't Mot. to Reconsider the Scope of Disc. and for Clarification at 1–2, ECF No. 507 (severity not among remaining Phase II issues); Order Denying Mot. to Amend Answer on the Grounds Requested at 8–9, ECF No. 535 (stating that fourteen plaintiffs in Phase I (including the three Phase II plaintiffs) "had established . . . sufficient severity to give rise to a taking" if the remaining Arkansas Game factors were met).

424. The United States contends that it was improper to rule on severity based solely on the record from Phase I. *See* United States' Response to Pls.' Notice re: the Date of Taking at 8 n.7. Moreover, the United States contends that even on the truncated record, substantial evidence shows that the severity of any additional incremental flooding is relatively small. *See, e.g.*, Sections VII.I, IX.B.2, IX.C.2, IX.D *supra*.

425. More fundamentally, Plaintiffs utterly failed to make any showing of any additional incremental flooding on their property, and therefore they cannot have met their burden to show that any additional incremental flooding was severe enough to constitute a taking.

XV. The Date of Any Purported Taking Was 2007, Not 2014, and These Claims Also Accrued at That Time

A. Legal Framework

426. In general, where the United States permanently takes an interest in real property, the date of a taking is the date the United States enters into possession of the property. *United States v. Dow*, 357 U.S. 20, 22 (1958); *see also United States v. Clarke*, 445 U.S. 253, 258 (1980) ("When a taking occurs by physical invasion, on the other hand, the usual rule is that the time of the invasion constitutes the act of taking . . . ."); *Best v. Humboldt Placer Mining Co.*, 371 U.S. 334, 340 (1963). This date is also "the date as of which the property is to be valued." *Dow*, 357

U.S. at 22; *see also Clarke*, 445 U.S. at 258 ("The value of property taken by a governmental body is to be ascertained as of the date of taking." (citing *United States v. Miller*, 317 U.S. 369, 374 (1943))).

427. When the interest taken by the United States is an easement to inundate property through flooding, there is no categorical exception to the general rule. *See Barnes v. United States*, 538 F.2d 865, 873–74 (Ct. Cl. 1976). But occasionally there are circumstances when flooding results from a "continuing process of physical events" set in motion by the United States. *See United States v. Dickinson*, 331 U.S. 745, 749 (1947); *Barnes*, 538 F.2d at 873–74; *Cotton Land Co. v. United States*, 75 F. Supp. 232, 233 (Ct. Cl. 1948) ("[A] succession of events was initiated which, when the events had all occurred in their natural order, deprived the company of the beneficial use of its land."). In such a case, the date of taking is set when the property has experienced flooding and the situation has "stabilized." *Barnes*, 538 F.2d at 873 (discussing *Dickinson*, 331 U.S. at 748–49). And the situation has stabilized when the physical process caused by government action has "substantially encroached the parcels at issue and the damages [are] reasonably foreseeable. *Banks v. United States* ("*Banks II*"), 741 F.3d 1268, 1272–73 (Fed. Cir. 2014) (quoting *Boling v. United States*, 220 F.3d 1365, 1373 (Fed. Cir. 2000));[35] *see also Turner v. United States*, 23 Cl. Ct. 447, 456–57 (1991). Put another way, stabilization happens when it has become "clearly apparent" that the character of flooding at a property due to a government-initiated process can "fairly be perceived." *See Barnes*, 538 F.2d at 873.

428. Further, where stabilization is an issue, "it is the uncertainty surrounding the permanent nature of the taking, not the uncertainty surrounding the ultimate extent of the[] damage, that is

[35] *Banks II* is not a flooding case, and it concerns claim accrual rather than date of taking *per se*; but in *Barnes* the Court of Claims held that in a stabilization case, the claim accrual and date of taking inquiries present the same "sort of question." 538 F.2d at 873.

critical in determining whether the situation has stabilized." *Boling*, 220 F.3d at 1371; *see also Whiteland Holdings, L.P. v. United States*, 141 Fed. Cl. 702, 711 (2019), *reconsid. denied*, No. 18-1081L, 2019 WL 2158874 (Fed. Cl. May 17, 2019), & *aff'd sub nom. Frazer/Exton Dev. L.P. v. United States*, 809 F. App'x 886 (Fed. Cir. 2020).

429. The date selected . . . depends on the facts of each case." *Barnes*, 538 F.2d at 873.

430. Because the date of taking (and claim accrual) inquiries are objective, "[a] party will be charged with knowing any facts that are discoverable in public records"; and a party's "ignorance of . . . legal rights arising from those facts" plays no role in establishing a date of taking (or determining when a claim accrued). *Jackson-Greenly Farm, Inc. v. United States*, 144 Fed. Cl. 610, 613 (2019) (quoting *Yankton Cnty. v. United States*, 135 Fed. Cl. 620, 630 (2017), *aff'd*, 753 F. App'x 905 (Fed. Cir. 2019)).

431. In *Barnes*, after the closing of the Gavins Point and Fort Randall dams, "a delta of unprecedented magnitude became established in the Missouri River channel at the mouth of the Niobrara River," leading to nearby farmland flooding in years from 1969 to 1975 at flows in that had not previously caused such flooding. *See* 538 F.2d at 868–69. Before the closure, the Corps had expected some delta growth, but thought it would be offset by channel bed degradation. *Id.* at 868. The court set the date of taking in November 1973, reasoning that by then, "the permanent character of intermittent flooding could fairly be perceived." *Id.* at 873.

432. In *Turner*, the Corps channelized and leveed part of a large creek in the 1960s, resulting in upstream erosion and downstream deposition of sand from highly erodible soil. *See* 23 Cl. Ct. at 449. The deposition "raised the general water surface level of the creek" in the vicinity of the plaintiff's farm. *Id.* In the next decades, a number of smaller-scale floods occurred and deposited some sand on part of the farm. *Id.* at 451. Then, in 1982 and 1983, "really serious" flooding

occurred and caused much greater sand deposition, leaving the property unfarmable. *Id.* In discussing accrual and the date of taking, the court acknowledged that "[t]he dynamics of the erosion-sedimentation-flooding cycle were initially manifested" not long after the channelization, "suggest[ing] that problem arose" well before 1982. *Id.* at 457. But because the extent of the damage was not clear until after the serious flooding in 1982 and 1983 (and the accompanying deposition of sand), the date of taking was set at the end of 1983. *Id.*

B. The Court Should Find that the Date of Taking Occurred in Late 2007, and that the Three Representative Plaintiffs' Claims Accrued at that Time

433. Here, the evidence and the Court's Phase I findings militate a date of taking (and, by extension, a date for the accrual of these Plaintiffs' claims) in late 2007, after the damage caused by that year's flooding was known.

434. In Phase I, the Court found that there was "extensive evidence," including public documents and testimony before Congress, discussing the chance that system and/or river changes might result in increased flooding of farm properties. *See Ideker Farms*, 136 Fed. Cl. at 675 (discussing, among other things, the 2003 Mitigation Project Final Environmental Impact Statement (PX99)). Phase I witnesses confirmed the intense public interest in how potential changes to reservoir operations might affect flooding and interior drainage downstream. *See, e.g.*, Ph. I Tr. 13061:17–13062:16, 13069:12–13070:2, 13072:7–13074:19; 13075:2–23, 13077:4–16, 13080:4–23 (Cieslik) (discussing comments received from Phase I representative Plaintiffs); Ph. I Tr. 499:21-500:18 (Ponganis); Ph. I Tr. 3191:20-3192:7 (Olson).

435. In Phase I, the Court also found that the Corps began "unprecedented" channel modifications and alterations to river training structures in 2004. *See Ideker Farms*, 136 Fed. Cl. at 668. These extensive activities would have been obvious, and Mr. Ideker's own construction company took part in them.

436. Plaintiffs in both phases of the case (including the Phase II representative Plaintiffs) have often described the flooding in 2007 and thereafter as "atypical." *See, e.g.*, Tr. 83:2–6 (Adkins); Tr. 152:19–153:9 (Schneider); Tr. 231:9–19 (Ideker). They have discussed how they track the relationship between nearby gage readings and flooding at their properties. *See, e.g.*, Ph. I Tr. 1444:25–1445:1 (Adkins) ("You learn to know what's going to happen when the Omaha gage is at a certain point."). They have also argued that they are close observers of the river. *See* Pls.' Ph. I Post. Tr. Br. at 89, ECF No. 374 (asserting that the landowners in this case are "experts in their own right as to the flooding in question, having lived on or near the river for generations").

437. Plaintiffs' Phase I expert, Dr. Hromadka, opined that he could "point to 2007" as a "point in time when the river reached a tipping point" and was "clearly out of equilibrium" because he saw "a dramatic change in the river response as far as flooding incidents to the Plaintiffs."[36] Ph. I Tr. 5185:23–5186:10 (Hromadka).

438. The Court concluded in Phase I that more severe flooding at the three representative properties in 2007 occurred as result of the combined and cumulative impacts of the Corps' actions under the MRRP, and was a foreseeable consequence of those actions. *See Ideker Farms*, 136 Fed. Cl. at 729 (Adkins); *id.* at 747 (Ideker Farms); *id.* at 757 (Buffalo Hollow); *see also id.* at 687, 696–97, 702–03 (expert testimony).

439. Unlike in *Barnes*, there was no simultaneous, countervailing physical process at work that might yet have had a mitigating effect as of the time of the first MRRP-caused flooding. And unlike in *Turner*, the alleged compensable damages here were caused by the floodwaters

[36] Indeed, Dr. Hromadka went further than that, stating that "based on other collateral knowledge and knowing what has happened to the river, you could put it that it probably reached a significant change in river response on or about year 2004, when the acceleration [in habitat construction] occurred." Ph. I Tr. 5186:11–15.

themselves, and not a secondary deposition of sediment that took longer to manifest than the initial flooding due to the Corps' actions. Accordingly, even if the flooding here resulted from a gradual physical process, the situation had stabilized at these three properties in the fall of 2007, once the damage caused by the 2007 flooding was known.

440. Plaintiffs filed their case on March 5, 2014, more than six years after the fall of 2007. *See* Compl., ECF No. 1. Accordingly, the three representative Plaintiffs' claims are all untimely. *See* 28 U.S.C. § 2501. The three representative Plaintiffs' claims should therefore be dismissed for lack of subject matter jurisdiction.

C. Plaintiffs' Anticipated Choice of December 31, 2014 as the Date of Taking is Incorrect

441. Plaintiffs' anticipated date of taking, December 31, 2014, has no relation to the facts of the case. *See Barnes*, 538 F.2d at 873. Rather, it aligns with a procedural determination the Court made in Phase I. *See Ideker Farms*, 136 Fed. Cl. at 670. The Court's procedural determination has nothing to do with when the United States took possession of a property interest in any plaintiff's property. Rather, the timing when the United States takes possession of a flooding easement must be determined by reference to the effects of the United States' actions on the properties. *Dickinson*, 331 U.S. at 749; *Barnes*, 538 F.2d at 873–74; *King v. United States*, 504 F.2d 1138, 1142 (Ct. Cl. 1974);*Cotton Land Co.*, 75 F. Supp. at 233; *Turner*, 23 Cl. Ct. at 457; *Jones v. United States*, 1 Cl. Ct. 329, 332 (1983); *see also Clarke*, 445 U.S. at 258.[37]

442. Even if the Court concludes that the date of taking is not in 2007, the great weight of evidence from both phases of the case shows that the character of the post-2007 flooding was

[37] At the close of Plaintiffs' case, the United States made a Rule 52 motion for judgment, based on Plaintiffs' failure to meet their burden to provide any evidence of a credible date-of-taking. Tr. 1233-38. The United States renews that motion here.

clearly apparent long before 2014. *E.g.*, Tr. 261:4-5; 259:13-17 (Ideker) (flooding since 2014 is consistent with the flooding from 2007 to 2014); Tr. 159:12-15 (Schneider) (same); Ph. I Tr. 4140:17-20 (Ideker) ("By [2010], if not before, after major flooding three out of four years, I knew something had definitely changed with the river. It was different than ever before."); Tr. 85:21-24 (Adkins) ("I can tell the Court with confidence that we have a changed river since 2004."); Tr. 144:13-15 (Schneider) ("[W]e have witnesse[d] the change[s] since 2006."); Ph. I. Tr. 1304:6-11 (Jackson) (river was different "prior to 2008"); Ph. I Tr. 3881:16 (Frakes Plaintiff Lanny Frakes makes repeated references to the changes since 2004, "The river has changed since 2004.") and later in the same paragraph, "The river has changed significantly since 2004." Ph. I Tr. 3884:4-7 (Frakes) ("From my personal observation, we had a stable river prior to 2007, one for which you could predict and reasonably plan your farm operations."); Tr. 3888:3-5 (Frakes) ("Anyone in our area who has any familiarity with this river before and after 2004 can see the difference."); Ph. I Tr. 1570:2-5 (Del Husz) ("You know, our damages started showing up around 2007."); Ph. I Tr. 1628:6-7 (Roth) ([T]here definitely seems to have been a change since roughly 2004."); Ph. I Tr. 1694:13-14 (Johnson) ("change" known by 2011, if not before). If, however, the Court were to conclude that the date of taking was December 31, 2014, damages incurred before that date would not be compensable, as they would be considered the product of tortious invasions. *See Barnes*, 538 F.2d at 874, and discussion *infra* §§ XVI.D–E.

XVI. If the Court Finds a Taking, the Court Should Adopt the United States' Analysis of Just Compensation for the Inverse Condemnation of an Easement to Flood Land

A. Fundamental Principles for Compensation Owed for a Partial Physical Takings

443. "The guiding principle of just compensation . . . is that the owner of the condemned property 'must be made whole but is not entitled to more.'" *United States v. 564.54 Acres of*

Land, 441 U.S. 506, 516 (1979) (quoting *Olson v. United States*, 292 U.S. 246, 255 (1934)) (emphasis removed).

444. Where the United States takes less than an entire parcel, "[the 'before and after' valuation] is generally the simplest and perhaps the most widely used approach" that "serves to lessen the pitfalls and problems that arise when a series of factors affecting value are added together to arrive at a total severance damage determination." *Ga. Pac. Corp. v. United States*, 640 F.2d 328, 336 (Ct. Cl. 1980).

445. In such before-and-after valuations, "just compensation" is the difference between the fair market value of the whole parcel immediately before the taking and the remainder after the taking. *United States v. Miller*, 317 U.S. 369, 376 (1943); *see also Otay Mesa Prop., L.P. v. United States*, 670 F.3d 1358, 1363–64 (Fed. Cir. 2012).

446. In most cases, just compensation under the Fifth Amendment is measured by the fair market value of the property on the date property is appropriated. *Kirby Forest Indus., Inc. v. United States*, 467 U.S. 1, 9-10 (1984) (citations omitted).

447. Under the fair market value standard, the owner is entitled to receive what a willing buyer would pay in cash to a willing seller at the time of the taking. *Kirby Forest*, 467 U.S. at 9-10 (citations and quotations omitted); *see also United States v. Cartwright*, 411 U.S. 546, 551 (1973) ("[T]he fair market value is the price at which the property would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or sell and both having reasonable knowledge of relevant facts." (quotations omitted)).

448. "[J]ust compensation must be measured by an objective standard that disregards values which are only of significance to an individual owner." *United States v. 50 Acres of Land*, 469 U.S. 24, 35 (1984).

449. "In cases of a partial physical taking . . . just compensation under the takings clause of the Constitution includes not only the market value of that part of the tract appropriated, but the damage to the remainder resulting from that taking . . . ." *Hendler v. United States*, 175 F.3d 1374, 1383 (Fed. Cir. 1999) (quotations omitted).

450. Because the fundamental basis of a claim of severance damages is diminution in the value of the remainder land, the law is that "strict proof of the loss of market value to the remaining parcels is obligatory." *Miller v. United States*, 620 F.2d 812, 828 (1980) (citation omitted).

451. "[T]he extent to which the utility of a property has been destroyed and its market value diminished must necessarily be established by factual data having a rational foundation in support of such a claim." *United States v. 26.07 Acres of Land*, 126 F. Supp. 374, 377 (E.D.N.Y. 1954) (citing *Westchester Cnty. Park Comm'n v. United States*, 143 F.2d 688, 692 (2d Cir. 1944)). *See also Gadsen Indus. Park, LLC v. United States*, 2020 WL 1932942, at *8 (Fed. Cir. Apr. 22, 2020) (affirming award of zero dollars in an inverse takings case where the trial court "was not given sufficient reliable proof of what a willing buyer would have paid for the [property]") (quotations omitted).

B. Just Compensation Must Be Carefully Tailored to the Circumstances of the Particular Case

452. "'[J]ust compensation' should be carefully tailored to the circumstances of each particular case" and "should be based on an assessment of precisely what the government takes from a landowner." *Otay Mesa Prop., L.P.*, 670 F.3d at 1368 (citing *Kimball Laundry v. United States*, 338 U.S. 1, 20 (1949), and *Gen. Motors*, 323 U.S. at 382); *see also Rasmuson v. United States*, 807 F.3d 1343, 1345–46 (Fed. Cir. 2015).

453. In *Otay Mesa*, the taking involved placing small sensors on the ground, but the trial court based the compensation award on the rental value of the property for uses like skydiving and parachute training. 670 F.3d at 1368–69. In reversing the trial court, the court of appeals closely assessed the facts and found that the United States had taken "a minimally invasive permanent easement to use undeveloped land that [wa]s unilaterally terminable," and concluded that such an easement "clearly differ[ed]" from leases to use the land in more invasive ways. *Id.* at 1368.

454. In *Rasmuson*, a rails-to-trails case, the court of appeals held that where a railway had no obligation to remove track or other structures upon the lapse of an easement, "a 'before' calculation that d[id] not take into account the costs of removing the physical remnants of the railway w[ould] result in an artificially inflated value and yield a windfall to the landowner." 807 F.3d at 1345. Further, the Court of Appeals observed that "'[i]n ascertaining market value, consideration should be given to all matters that might be brought forward and reasonably be given substantial bargaining weight by persons of ordinary prudence,'" and that "a reasonably prudent buyer would consider evidence of an abandoned railway when formulating an offer for agricultural property." *Id.* (quoting Appraisal Institute, Uniform Appraisal Standards for Federal Land Acquisition § B–2 (2000 ed.) (alteration in original)).

455. In this case, careful tailoring of compensation must account for the difference between the flood risk/flooding the representative Plaintiffs *did* experience and the flood risk/flooding the representative Plaintiffs *would have* experienced but-for the Corps' actions under the MRRP. *See Rasmuson*, 807 F.3d at 1345.

456. The evidence offered by one of Plaintiffs' damages experts, Dr. Bateman, totally fails the "careful tailoring" test because Dr. Bateman assumes that that the high water events from 2007 through 2014 would have had no effect on crop yields absent the MRRP. Dr. Evans's modeling

and the representative Plaintiffs' own pre-MRRP crop yield records refute this assumption. *See supra* §§VII.D, IX.E; *cf. Gadsen Indus. Park*, 2020 WL 1932942, at *8 (affirming zero-dollar award of just compensation where Plaintiffs' proof was deficient).

457. The evidence offered by Plaintiffs' other damages expert, Dr. Babcock, also fails, because Dr. Babcock conducted only a flawed econometric analysis of four counties far removed from the actual Plaintiffs' properties, and ignored relevant data proximate to Plaintiffs' farms. *See* Section IX.B.1. Dr. Babcock also failed to differentiate in his model between flooding that allegedly was caused by the Corps and flooding that occurred regardless of the Corps' actions. Indeed, Dr. Babcock's model uses 2011 as its trigger point for assessing flood impacts, even though this Court explicitly found that the 2011 flooding was not caused by the Corps' actions. *Id*. *See Gadsen Indus. Park*, 2020 WL 1932942, at *8 (affirming zero-dollar award of just compensation where Plaintiffs' proof was deficient).

458. Further, for calculating a diminution in value, under *Rasmuson* and *Otay Mesa* any effect of the 2011 flood on land values would not be includable in a just compensation award.

459. In this case, the United States contends that if any taking has occurred, then that taking is of a permanent flooding easement.[38] The facts of this case do not reflect any temporary taking. The Corps' activities on the river have not been rescinded, so any flooding changes they may have caused are not temporary. Because the facts do not support any logical construction of a temporary taking for any particular time period, the United States is unable to provide a just compensation analysis for any hypothetical temporary taking.

[38] To be clear, the United States contends that the facts of this case do not suggest any taking at all.

C. Plaintiffs' Claims of Property Value Losses Are Meritless

460. Dr. Babcock's estimates of property value losses are flawed, because they explicitly rely on property valuations from 2014, which cannot logically be the proper date of taking. Accordingly, Dr. Babcock's analysis proves nothing relevant. *See* Section IX.B.1.

461. Dr. Sunding's analysis provides a much clearer and more reliable assessment of Plaintiffs' property values over time. *See* Section IX.B.2. Dr. Sunding showed that the evidence gathered by Plaintiffs' own appraisers reveals no significant change in property value after the Corp's MRRP actions. *Id.* Indeed, Dr. Sunding demonstrated that Plaintiffs' property values have increased substantially since the Corps' MRRP actions. *Id.* And in the particular flood years at issue here, the property values in the Missouri bottomlands actually exceeded the property values in the Nishnabotna bottomlands that were identified by Dr. Babcock. *Id.*

D. Crop Losses Incurred Before the Date of Taking Are Not Compensable Because At That Point, There Has Been No Taking

462. It is well-established that if the date of taking for an easement to flood property is set after the property first experiences flooding due to the relevant government action, the landowner cannot receive an "award for crop damage sustained prior to that time." *Barnes*, 538 F.2d at 873–74. Rather, "[a]t best, crop damages sustained prior to the date of taking . . . are the product of tortious invasions-mere trespasses" that have not yet "ripen[ed] to the extent necessary to confer on the defendant a flowage easement." *Id.* at 874.

E. Crop Losses Incurred on or After the Date of Taking Generally Are Not Compensable Separate from the Value of the Land Unless There Were Mature but Unsevered Crops on the Property on the Date of Taking

463. Because "unsevered crops not ready for harvest as a general rule constitute a part of the realty," it is well-established that "a growing but immature crop cannot properly be valued separately from the value of the realty itself." *Barnes*, 538 F.2d at 874; *see also King*, 504 F.2d at

1142; *Jones*, 1 Cl. Ct. at 333. Damage to crops after the date of taking "result[s] from exercise of the easement prerogatives," and separate compensation for such damage would amount to double-payment. *King*, 504 F.2d at 1142 ("Manifestly it would be improper for the Government to pay twice for the flowage rights.").

F. Consequential Damages Are Not Includable as Just Compensation

464. The Fifth Amendment provides the right to just compensation for property taken, not "damages" that are the alleged "proximate result" of the government's action. *Yuba Nat. Res.*, 904 F.2d at 1581 ("It is a well settled principle of Fifth Amendment taking law . . . that the measure of just compensation is the fair value of what was taken, and not the consequential damages the owner suffers as a result of the taking."); *see also Kirby Forest*, 467 U.S. at 15 (Just compensation is "the fair market value of the property on the date it is appropriated" and "[u]nder this standard, the owner is entitled to what a willing buyer would pay in cash to a willing seller' at the time of the taking."); *564.54 Acres of Land*, 441 U.S. at 511; *Pettro v. United States*, 47 Fed. Cl. 136, 151 (2000) ("In the temporary takings situation, rental value is seen as an appropriate measure because the property is returned to the owner when the taking ends, and the government, therefore, should only pay for its use of the property." (citing *First English Evangelical Lutheran Church of Glendale v. Cnty. of Los Angeles*, 482 U.S. 304, 319 (1987), and *Yuba Nat. Res., Inc.*, 904 F.2d at 1580–81)). Thus, "not all losses suffered by the owner are compensable under the Fifth Amendment." *U. S. ex rel. Tennessee Valley Auth. v. Powelson*, 319 U.S. 266, 281 (1943) (citations omitted).

465. To be sure, there exist alternative ways to assess and calculate the compensation owed to landowner for governmental interference with the use of property. *See Otay Mesa*, 670 F.3d at 1369; *Ridge Line v. United States*, 346 F.3d 1346, 1359 (Fed. Cir. 2003); *Vaizburd v. United States*, 67 Fed. Cl. 499, 501–02 (2005) (remand decision awarding "costs associated with

mediating or preventing the injury," but only to the extent those costs were supported by the record). The existence of such alternatives, however, does not transform the nature of what is compensable in a takings action; rather, it acknowledges that there are different means to calculate such compensation. *See Vaizburd*, 67 Fed. Cl. at 501 (where appropriate, "'cost of cure' approach to recovery in a takings case is an alternative to computing damages through diminished market value").

466. Thus, to the extent Plaintiffs' argue that under *Ridge Line*, just compensation should match or resemble damages in a tort case, they are mistaken. The statement in *Ridge Line* that just compensation "includes a recovery for 'all damages, past, present and prospective'" does not expand the *type* of damages that may be compensable in a takings action. *See* 346 F.3d at 1359 (quoting *United States v. Dickinson*, 152 F.2d 865, 867 (4th Cir. 1946), *aff'd*, 331 U.S. 745 (1947)). Rather, it affirms that where an alternative method for calculating compensation is used, such compensation *in a single action* fulfills the Fifth Amendment's mandate for compensation. *See Vaizburd*, 67 Fed. Cl. at 501 (noting that, pre-*Ridge Line*, the court had "assumed that the burden of a re-occurring need for mediation had to be reflected in market data" for damage to property to be compensable in takings action); *id.* at 502 (observing that "if the fence atop the bulkhead—the cost of which we are allowing plaintiffs' to recover—were to serve its intended function, there would have been less sand getting into the backyard, reducing [future] removal expenses," and that it was therefore proper to "grant the full amount of the estimate for landscaping and sand removal from the backyard for one year, but award nothing for subsequent costs of that type"). [39]

[39] The tort-taking distinction is a threshold question because tort claims are not within the Court's jurisdiction and the United States has immunity from tortious flood damage claims. *Ridge Line*, 346 F.3d at 1355; 28 U.S.C. § 1491(a)(1); 33 U.S.C. § 702(c). In Phase I, Plaintiffs improperly

467. The United States does not dispute that if this Court finds a taking, just compensation is due. But Plaintiffs have not shown why the ordinary before-and-after methodology is not sufficient to award compensation for a partial taking in this case. Indeed, Plaintiffs seek an award based on the diminution in value. And the before-and-after method is the right method in this case; otherwise, the United States would be transformed into a general insurer against agricultural and other losses even after the date of taking. *See Jones*, 1 Cl. Ct. at 333 (after "flooding conditions made it obvious that the Government's operation of the Missouri River Main Stem System had permanently interfered with plaintiffs' use of that part of their farmlands affected by the altered flow," landowners "cannot be permitted to ignore such physical conditions and avoid responsibility for knowledge that the Government had taken part of their land when they chose to go forward" with using and improving that land).

468. Therefore, the additional compensation Plaintiffs seek beyond diminution in value is in the nature of consequential damages, rather than in the nature of an alternative calculation of just compensation. Indeed, Dr. Bateman reported that he assumed that all of the injuries and losses provided to him by Plaintiffs were compensable when he calculated just compensation. Tr. 611:5-613:1 (Bateman). But, the Bateman model measures the damage to business activity on the land rather than the land itself. Tr. 729:2-5 (Bateman). These types of damages are consequential and are not compensable. *See General Motors v. United States*, 323 U.S. 373, 380 (1945) ("[T]hat which is taken or damaged is the group of rights which the so-called owner exercises in his dominion of the physical thing, and that damage to those rights of ownership does not include losses to his business or other consequential damage.").

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relied on tort law with respect to foreseeability and causation. In Phase II, Plaintiffs improperly claim consequential damages that sound in tort, such as crop losses, losses to structures and equipment, and remediation costs.

469. Specifically, Plaintiffs allege the following damages above and beyond the value of the property:

- Crop losses
- Damage to structures
- Damage to equipment
- Expenses of flood prevention (sandbagging, rocking banks, constructing levees, etc.)
- Expenses of flood reclamation (sand/debris removal, levee repairs, filling holes, etc.)
- Lost investment opportunities
- Lost profits based on reduced yields

Tr. 577:3-578:8 (Bateman); Tr. 610:25-614:4 (Bateman); Tr. 573:23-574:2 (Bateman); Tr. 728:4-21 (Bateman).

470. It is improper to *both* claim compensation for diminution in value *and* compensation for costs related to crop losses, repair of structures, repair and replacement of equipment, rocking banks, sandbagging, building earthworks to protect against future flooding, sand/debris removal, and levee repairs. S*ee Yuba Nat. Res., Inc. v. United States*, 904 F.2d 1577, 1581-82 (Fed. Cir. 1990) ("[Plaintiff's] claim for the difference in the value of the gold during the taking period and after the taking is precisely the kind of claim for consequential damages—here, lost profit—that is not an appropriate element of just compensation for the temporary taking of the property."); *United States v. Certain Interests in Prop. In Cumberland Cnty.*, 296 F.2d 264, 266 n.1 (4th Cir. 1961) ("[R]eplacement cost, or reproduction costs, may be considered only when property deductions are made for physical and economic depreciation and obsolescence."). Replacement costs should not be equated with market value. *See 10,031.98 Acres of Land v. United States*, 850 F.2d 637 ("It has long been held in condemnation suits that the offering price of replacement properties cannot be used to show the fair market value of the condemned land."); *see also* Yellow Book § 4.4.3 (explaining that replacement or reproduction costs are components of the

cost approach, which has been characterized as "one of the lease reliable indicia of market value" for the purpose of measuring just compensation (quoting *Certain Interests in Prop. In Champaign Cnty.*, 271 F.2d at 382)).

471. Further, even if the Court adopted an alternative to the usual method for calculating compensation, compensation properly would only include an amount "proportionate to the government's quantitative contributions" to the damage incurred. *Ridge Line*, 346 F.3d at 1359. As discussed above, however, Plaintiffs have made *no effort whatsoever* to apportion crop losses, debris removal, rocking, or any other costs of this nature to the increment of flooding caused by the Corps' actions under the MRRP. This is a fundamental failure of proof. *See Vaizburd*, 67 Fed. Cl. 502–03 (awarding certain one-time costs, but finding that "[t]he balance of the claim fails for lack of proof")/

472. Additionally, Plaintiffs' suggestion that they are entitled to damages for lost investment opportunities and lost profits are also improper. Many cases make clear that Plaintiffs are not entitled to such consequential losses. "Under federal law, there can be no recovery for consequential damages as a result of a taking." *Georgia-Pac.*, 640 F.2d 328, 361 (citing *Mitchell v. United States*, 267 U.S. 341, 345-46 (1925)). "The owner must be compensated for what is taken from him, but that is done when he is paid its fair market value for all available uses and purposes." *Georgia-Pac.*, 640 F.2d at 360 (citing *United States v. Chandler-Dunbar Water Power Co.*, 229 U.S. 53, 81 (1913)).

473. In short, the remedy in a Fifth Amendment takings action is just compensation – not damages. It is well-established that consequential losses are not a component of just compensation. Further, the before-and-after method of valuation is the right method to apply

here. Therefore, compensation should not be awarded for any of the above-listed categories of damages.

G. The Court Should Apply Appropriate Offsets Against Any Just Compensation Award

474. To the extent this Court considers the consequential damages Plaintiffs claim as part of a just compensation award, it must account for payments already made to Plaintiffs that offset those damage claims. The Federal Circuit has articulated the appropriate process for calculating just compensation in a physical takings case, and that process includes offsetting government payments.

> [T]he proper analysis is to treat the initial taking as permanent and to calculate the damages for the taking by starting with the amount that the plaintiff lost as a result of the initial taking and subtracting from that sum the amount by which the plaintiff was made better off by the steps taken by the government to offset the impact of the taking.

Indep. Park Apartments v. United States, 449 F.3d 1235, 1247 (Fed. Cir. 2006).

475. Further, takings jurisprudence is grounded in the notion of compensating property owners for losses, but not punishing the taker. "The noun 'compensation,' standing by itself, carries the idea of an equivalent. Thus we speak of damages by way of compensation, or compensatory damages, as distinguished from punitive or exemplary damages, the former being the equivalent for the injury done, and the latter imposed by way of punishment." *Monongahela Nav. Co. v. United States*, 148 U.S. 312, 326 (1893). A fair and accurate determination of damages from lost crops and other consequential damages must consider payments already made to Plaintiffs by the Defendant for the same damages. *See, e.g.*, *United States v. Fuller*, 409 U.S. 488, 490 (1973) (explaining that the just compensation requirement is derived as much from basic principles of fairness as from technical concepts of property law); *United States* v. *Commodities Trading Corp*., 339 U.S. 121, 123-124 (1950) (explaining that Fifth Amendment's use of the word "just" evokes principles of fairness and equity).

476. A significant portion of the damages Plaintiffs are seeking are damages for lost profits they allege they would have realized but-for flooding caused by the Corps actions. Integral to this damages calculation are the costs that Plaintiffs would have incurred in their but-for scenario – the costs they *avoided*. In the same way that courts recognize avoided costs as an integral part of the damages calculation, costs that have already been repaid are integral to the determination of damages here. "Avoided costs and expenses are part of the 'but-for' world of lost profits, which plaintiff must establish with reasonable certainty." *Englewood Terrace, Ltd. Partnership v. United States*, 113 Fed. Cl. 718, 731 (2013), *aff'd*, 629 F. App'x 977 (Fed. Cir. 2015). "Even if defendant contributes to the determination of avoided costs, however, plaintiff ultimately bears 'the burden of demonstrating '"what might have been."'" *Id.* (quoting *Bluebonnet Savings Bank F.S.B. v. United States*, 67 Fed. Cl. 231, 238 (2005), *aff'd sub nom. Bluebonnet Sav. Bank, F.S.B. v. United States*, 466 F.3d 1349 (Fed Cir. 2006)). The Federal Circuit has demanded precision in this calculation. In *Yankee Atomic Electric Co. v. United States*, the Court reversed findings in favor of plaintiff because the trial court had not made findings about the specific rate at which the Government was contractually obligated to accept radioactive waste from the plaintiff companies. 536 F.3d 1268 (Fed. Cir. 2008).

477. In a recent Fifth Amendment takings claim, plaintiffs failed to meet this standard, and were consequently awarded *no* damages by this Court. *See Gadsden Indus. Park, LLC v. United States*, 956 F.3d 1362, 1373 (Fed. Cir. 2020). The Federal Circuit affirmed this conclusion, finding that the plaintiff's damages expert "arbitrarily lowered [plaintiff]'s avoided costs at every turn." *Id.* The Federal Circuit determined that this expert's "unreliable calculations left open too many variables for the trial court to resolve on its own with reasonable certainty based on the

evidence available." *Id.* So too here, where Plaintiffs have failed to establish their consequential damages, and "what might have been," with sufficient certainty.

478. Each of Plaintiff received substantial sums to address crop losses and other consequential damages due to flooding disasters affecting the representative properties. *See supra*, § IX.F. How these payments are offset depends on whether and how the court decides to award these consequential damages. Payments received are described in detail above in Section IX.F. If the Court agrees with the United States that the date-of-taking is in 2007, then there would be no need to address offsets because in addition to being uncompressible consequential damages, the Court would dismiss Plaintiffs claims for lack of subject matter jurisdiction. Alternatively, if the Court adopts Plaintiffs' contention that the date-of-taking is on December 31, 2014 and grants Plaintiffs consequential damages for all years, then the appropriate offsets for the Adkins & Sons partnership should be $90,475.00 for crop insurance payments for 2007-2010 and $100,000.00 for other consequential damages." *See supra*, § IX.F.1 and 2; the appropriate offsets for the Ideker Farms Inc. should be $901,756.00 for crop insurance payments for 2007-2014 and $219,078.36 for other consequential damages." *See supra*, § IX.F.1, 2 and 3; and the appropriate offsets for the Buffalo Hollow Farms Inc. should be $485,259.00 for crop insurance payments for 2007-2014 and $59,987.00 for other consequential damages." *See supra*, § IX.F.1 and 2.

H. The Court Should Apply Dr. Sunding's Formulation of Prejudgement Interest

479. While the Court may award prejudgment interest in appropriate circumstances, the rate of prejudgment interest requested here by Plaintiffs is inappropriate. The proper rate of prejudgment interest "puts the property owner in as good a financial position as if the compensation were given concurrently with the taking." *Textainer Equip. Mgmt. Ltd. v. United States*, 115 Fed. Cl. 708, 719 (2014) (citing *Kirby Forest Indus. v. United States*, 467 U.S. 1, 10

(1984). Dr. Sunding provided a calculation of that rate as the one-year Treasury bond rate, based on the undeniable fact that Plaintiffs here are receiving that interest in a risk-free manner. *See supra* Section IX.G; DX6033-0024 (table listing of proper interest rates). Dr. Sunding's calculation calls for compounding annually, as is endorsed by prevailing precedent. *See Textainer*, 115 Fed. Cl. at 719.

480. Dr. Bateman's interest calculations should be rejected. *See Sears v. United States*, 124 Fed. Cl. 730, 736 (2016) ("Nonetheless, the court does not agree with plaintiffs that a diversified mutual fund such as VBINX is the best instrument against which to measure the interest rate due in this case" and "Although [a diversified mutual fund such as BVINX] might otherwise be considered 'prudent' under some economic conditions, it does not currently comport sufficiently with the 'minimal risk' criterion."). The Bateman portfolio has a volatility of 9.22, which he knew was high. Tr. 792:2-25 (Bateman). *See Sears*, 124 Fed. Cl. at 736 (holding that the VBINX fund had a volatility of 7.4 and was too risky to be used to measure interest on just compensation).

Respectfully submitted on this 28th day of August, 2020.

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